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# Canada's recent inflation experience

November 1978

One of a series of papers  
on medium and long-term  
economic issues







## PREFACE

Early in 1978, the Department of Finance published a document - Canada's Economy - Medium-Term Projections and Targets - which was intended to provide a macro-economic framework within which medium-term economic issues could be discussed and analyzed. Canada's Economy set out a perspective on the long-run growth potential of the Canadian economy, and outlined a possible medium-term recovery path which would move the Canadian economy closer to potential levels of output over the period to the early 1980s. A steady reduction in the rate of inflation over the medium term was viewed as being a key condition upon which the achievement of sustained economic recovery would be dependent.

This paper extends the discussion of inflation provided in Canada's Economy in a number of directions. It presents an extensive historical analysis of the Canadian inflation experience, placing particular emphasis on the experience of the early and mid 1970s. This analysis provides the background necessary to assess the conditions under which a simultaneous reduction in the rates of inflation and unemployment may be achieved. The paper also examines the relationship between Canadian and American rates of inflation, and addresses the issue of whether the Canadian economy can be insulated from price movements in the United States.

The analysis contained in this paper has been discussed with persons in several independent organizations - the C.D. Howe Research Institute, Informetrica Ltd., the Institute for Policy Analysis of the University of Toronto and several faculty members in the Department of Economics at the University of British Columbia. Their comments, criticisms and suggestions have been extremely helpful. The responsibility for the views expressed in this paper, however, rests entirely with the Department of Finance.





## TABLE OF CONTENTS

1.	Introduction.....	1
2.	Main Themes.....	5
3.	Canada's Inflation: An Historical Overview.....	7
4.	Theory of Inflation.....	19
4.1	The Short-Term Inflation-Unemployment Trade-Off.....	20
4.2	Price Expectations and Inflation.....	21
4.3	The Role of Price Shocks and Relative Price Changes in Generating Inflation.....	23
4.4	Structural Changes in the Labour Market.....	24
4.5	Summary.....	24
5.	The Role of Price Expectations and Price Shocks in Canada's Recent Inflation Experience .....	27
6.	Labour Market Developments and Structural Changes in the Inflation-Unemployment Trade-Off .....	35
6.1	Rapid Growth of the Youth and Adult Female Labour Forces.....	35
6.2	The 1971 Revisions to the Unemployment Insurance Act.....	36
6.3	Growth of Multi-Earner Families.....	40
7.	Empirical Estimates of the Canadian Short-Term Inflation-Unemployment Trade-Off.....	43
7.1	The Short-Term Trade-Off: Empirical Evidence .....	44
7.2	The Medium-Term Trade-Off .....	47
8.	Incomes Policies and the Short-Term Trade-Off Curve .....	51
9.	The Relationship between Canadian and U.S. Inflation.....	55
9.1	The Process of Insulation.....	55
9.2	Ties with the United States.....	56
10.	Conclusion.....	61

## LIST OF TABLES

1.	Average Annual Percentage Changes in Consumer Price Indexes of Selected OECD Countries, Selected Periods, 1953-1977 .....	3
2.	Average Annual Percentage Changes in Money Supply, Real GNE, and Consumer Price Indexes, Selected OECD Countries, Selected Periods, 1961-1975 .....	11
3.	Annual Percentage Increases in Selected Commodity Prices, 1972-1977 .....	12
4.	Comparison Between First and Revised Estimates of Real GNE Growth, Canada, 1971-1977 .....	14
5.	Annual Percentage Changes in Selected Components of the Consumer Price Index, Canada, 1965-1977 .....	31
6.	Percentage of Wage Settlements with Cost of Living Allowance (COLA) Clauses, and the Average Duration of Wage Contracts, Canada, 1967-1977 .....	32
7.	Annual Percentage Changes in the Consumer Price Index, and Labour Income Per Paid Worker, Canada, 1966-1975 .....	33
8.	Disqualifications for Voluntary Quit, Nonavailability, Noncapability and Refusal to Accept Suitable Work, as a Percentage of the UI Insured Population, and of Initial UI Claims Filed, Canada, 1965-1974 .....	38
9.	Percentage of Family Units with Some Unemployment Having at Least One Person Employed, Canada, Selected Years, 1961-1977 ....	40
10.	Alternative Inflation-Unemployment Relationships, Canada.....	45
11.	Estimated Impact of Changes in the Unemployment Rate on the Annual Percentage Change in Wages, Canada .....	46
12.	Alternative Paths for Inflation and Unemployment, Canada, 1978-1981 .....	48
13.	Percentage Increases in Negotiated Base Rates, and Wages and Salaries per Employed Person, Canada, 1970-1978 .....	52
14.	Percentage Changes in the Consumer Price Index and the AIP targets, Canada .....	53



## LIST OF CHARTS

1.	GNE Cyclical Output Gap, and Percentage Changes in the Consumer Price Index (total, and excluding food and energy components) and the GNE Price Deflator, Canada, 1953-1977 .....	8
2.	Percentage Changes in the Money Supply (M1), Canada, 1953-1977 .....	10
3.	The Aggregate Unemployment Rate, and Percentage Changes in Average Wages and Salaries, Canada, 1947-1977.....	15
4.	The Aggregate Unemployment Rate, and Percentage Changes in the Consumer Price Index, 1947-1977 .....	16
5.	Percentage Changes in the Consumer Price Index, and in the Weighted Variance of the Components of the Consumer Price Index, Canada, 1950-1977 .....	28
6.	Aggregate Unemployment Rates, and Percentage Changes in Consumer Price Indexes, Canada and the United States, 1930-1977 .....	57
7.	Aggregate Unemployment Rates, and Percentage Increases in Consumer Price Indexes, Hourly Compensation in Manufacturing and Output per Man-hour in Manufacturing, Canada minus the United States, 1960-1977 .....	59





## 1. INTRODUCTION

In the paper Canada's Economy,<sup>1</sup> three important propositions were set out with respect to the behaviour of the rates of inflation and unemployment over the medium term. They were: first, that continued deceleration in the rate of inflation is necessary if a sustained recovery is to be achieved; second, that it is possible for the rates of inflation and unemployment to be reduced simultaneously; and third, that the rate of inflation in Canada over the medium term need not be tied to the rate of world inflation, and in particular to that of the United States. This paper focusses on the second and third propositions, in order to assess under what conditions these propositions hold.

The first proposition was based on a number of pieces of empirical evidence. First, the personal savings rate of Canadians rose to a postwar high in the mid 1970s, reaching almost 11.0 per cent in 1975 and falling only slightly to 10.7 per cent in 1977. The behaviour of the personal savings rate over the postwar period was highly correlated with the rate of inflation. Consequently, it is likely that a sustained decline in the rate of inflation would be required for there to be a significant decline in the personal savings rate. A lower savings rate would be associated with higher consumption growth, which in turn would contribute to higher utilization rates for capital, and to additional investment expenditures. Reduced personal savings would lessen the burden already placed on government fiscal policy to stimulate the economy, and allow government sector deficits to decline as a share of gross national expenditure.

A second important piece of empirical evidence concerned the loss in international competitiveness that Canada experienced during the 1970s. This loss in competitiveness was an important factor (although not the only one) contributing to the large current account deficits that began to emerge in 1974, reaching a peak of \$4.8 billion in 1975 and declining only to \$4.2 billion in 1977. A failure to reverse the deterioration in international competitiveness would result in increasing current account deficits, further exchange rate depreciations and increasing inflationary pressures. In such a situation the ability of the government sector to support a recovery through fiscal stimulus would be reduced.

There is as well an important interaction between inflation and profits, and, through profits, between inflation and investment. High rates of inflation raise nominal profits but probably lower real profits. In addition, high nominal profits may set in motion wage pressures which can further reduce the competitive position of firms. Increases in the

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<sup>1</sup> Canada's Economy - Medium-Term Projections and Targets, Department of Finance, February 1978.

rate of inflation probably increase uncertainty and raise the cost of capital. Thus, ever-rising rates of inflation likely lower the real rate of return, raise the cost of capital, and thereby bring about a reduction of investment. Conversely, a downward trend in inflation would tend to improve real rates of return, lower the cost of capital, and encourage investment.

It is possible to devise initiatives to counteract some of the effects of inflation just described. It is preferable, however, to deal with the problem of inflation itself, rather than with each of its many consequences separately. High rates of inflation have disruptive allocative and distributive effects domestically. In addition, the Canadian economy is significantly affected by external price changes. A deceleration in Canada's rate of inflation could make Canada less vulnerable to the possibility of a major inflationary spiral touched off by external price shocks.

The second proposition set out in Canada's Economy was that it is possible to reduce the rates of inflation and unemployment simultaneously. This proposition does not imply a rejection of short-term trade-offs between inflation and unemployment. However, it does reject the view commonly held during the 1960s that a permanent trade-off exists between inflation and unemployment. The current consensus among economists is that the relationship between inflation and unemployment is far more complex than was believed to be the case in the 1960s. Short-term trade-offs exist, but are highly unstable and are likely to be influenced by a variety of factors, including prevailing expectations about inflation. There is thus no unique short-term trade-off between inflation and unemployment which permits an economy to achieve low rates of unemployment permanently, at the cost of a higher, but stable rate of inflation.

To the extent that an unstable short-term trade-off curve shifts "upwards" over time, higher rates of inflation become associated with higher rates of unemployment. This has been Canada's experience since the mid 1960s. The proposition put forward in Canada's Economy was in essence that this process could be reversed, i.e., that the short-run trade-off relationship could be shifted "downwards", and thus that rates of inflation and unemployment could be simultaneously reduced. This paper examines what is required to achieve the simultaneous reduction of rates of inflation and unemployment.

In setting out the medium-term inflation profile, Canada's Economy was implicitly arguing for a target which meant that the rate of inflation in Canada would be reduced relative to the rate of inflation expected in the rest of the world, and in particular in the United States. Historically, however, the Canadian rate of inflation has seldom differed substantially from the U.S. rate for a sustained period of time. Table 1 presents average rates of change of consumer price indexes in selected OECD countries over selected periods. Canada's inflation rate was below that of the U.S. during the period of peak U.S. involvement in Vietnam, but since 1972 has averaged over a percentage point higher than the U.S. rate. On the other hand, Canada has experienced rates of inflation lower than most other major OECD countries over the past twenty-five years.



Table 1

Average Annual Percentage Changes in Consumer Price Indexes of  
Selected OECD Countries, Selected Periods, 1953-1977

	<u>1953-1965</u>	<u>1966-1972</u>	<u>1973-1977</u>
Canada	1.5	3.9	8.9
United States	1.4	4.1	7.7
Japan	3.6	5.4	12.9
France	4.0	4.8	10.3
Germany	2.1	3.3	5.7
Italy	3.2	3.7	16.1
United Kingdom	2.8	5.6	16.1
Belgium	1.8	3.9	9.7
Netherlands	3.0	5.6	8.6
Sweden	3.4	5.1	9.6

Source: International Monetary Fund, International Financial Statistics, May 1978.

Is it necessary for Canada to have a rate of inflation substantially below that of the U.S.? From the point of view of Canada's competitive position vis-à-vis the U.S., the answer is probably no. Indeed, Canada's inflation rate could be higher than that of the U.S., as it has been since 1971, and exchange rate adjustments could be expected to eventually offset a deteriorating competitive position. As was noted earlier, however, high rates of inflation have disruptive allocative and distributive effects domestically, whether or not major trading partners are experiencing similar rates of inflation. In addition, because of the openness of the Canadian economy, a deceleration in Canada's rate of inflation could mitigate the effects of external price shocks on the economy.

Forecasts available at the time Canada's Economy was written suggested that U.S. inflation would not decelerate to low levels over the medium term. Present forecasts suggest an even more pessimistic outlook, with the possibility of a re-acceleration of U.S. inflation being quite strong. It now appears as though a significant winding down of Canada's inflation rate would necessitate breaking the historical relationship with the U.S.

The task of improving the ability of the Canadian economy to insulate itself from higher U.S. inflation, and at the same time achieving reductions in unemployment over the medium term, represents a major challenge to Canadians. This was the message of Canada's Economy and remains the message of this paper:

"In these medium-term projections it has been assumed that... the rates of price and wage increases continue to decline. This is a critical assumption on which the rest of the projections are dependent. To obtain such a performance will require successful post-controls policies as well as responsive attitudes in the private sector."

The purpose of this paper is to provide a discussion of the underlying causes of Canada's worsening inflation over the last ten years. The paper has ten sections. The following section provides a brief summary of the main themes which are developed in more detail in later sections of the paper. Section 3 integrates these broad themes into a descriptive overview of Canada's inflation experience over the past 10 to 15 years. This section is intended to provide an historical framework within which to place the more analytical sections which follow in the remainder of the paper.

A necessary starting point for any examination of the causes of inflation is a theory of inflation. Section 4 of the paper contains a brief theoretical discussion of the causes of inflation, highlighting both the areas in which there is a consensus among economists and also issues about which judgements differ. Section 5 examines in greater detail the roles of inflationary expectations, price shocks and relative price changes in the inflation process. In section 6 the effects of institutional and behavioural changes in the labour market on the inflation-unemployment trade-off are considered. Section 7 summarizes several recent empirical estimates of the short-term inflation-unemployment trade-off for Canada. As well, for illustrative purposes, alternative medium-term inflation-unemployment paths are discussed. Incomes policies, with particular reference to the Canadian experience since 1975, are discussed in section 8. Section 9 examines the historical relationship between Canadian and U.S. inflation and addresses the issue of whether Canada might be able to insulate itself from higher U.S. inflation. The final section summarizes the main conclusions.

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<sup>1</sup> Canada's Economy - Medium-Term Projections and Targets, Department of Finance, February 1978, p.3.



## 2. MAIN THEMES

It is useful to begin by summarizing briefly the main themes that emerge in the paper.

- In the long run inflation is primarily a monetary phenomenon. Increases in the rate of growth of the money supply eventually lead to corresponding increases in the rate of inflation. In the short and medium term, however, increases in the money supply do not necessarily lead to proportional increases in the rate of inflation, nor do decreases in the money supply necessarily lead to proportional reductions in the rate of inflation.
- The short-term relationship between changes in unemployment and changes in wages depends fundamentally on the flexibility of real and money wages. The available evidence suggests that in Canada there is a high degree of wage inflexibility. At high rates of unemployment, a further increase in the unemployment rate has relatively little effect in the short run on the rate of change of wages. At low rates of unemployment, however, a change in the unemployment rate has a more pronounced effect on the rate of change of wages.
- Not all prices are determined primarily by wage costs. For many products (e.g. agricultural products), market demand factors and supply constraints have more influence on prices than do changes in wage and salary costs. Changes in the prices of imported goods and changes in the exchange rate as well as changes in taxes and government charges can all lead to changes in prices independently of wage behaviour. It is possible, therefore, to have rising rates of inflation for periods of time, despite decelerating rates of wage change.
- In the medium term the response of the rate of wage change to changes in the unemployment rate will depend not only on the degree of wage flexibility but also on the speed of adjustment of inflationary expectations to changes in the rate of inflation. It is not possible to state precisely how price expectations are formed. There seems little doubt, however, that they are influenced by past price behaviour.
- In the period up to 1973 there were a number of factors operating to increase the rate of inflation. These factors were: strong aggregate demand growth, which resulted in part from overly expansive aggregate demand policies; increasing inflationary expectations; and rising public sector wages.
- Important structural changes were also occurring in the labour market during this period. The increasing participation rates of women and youths, the 1971 Unemployment Insurance Act revisions, and the growing numbers of multi-earner families, raised the cyclically-adjusted unemployment rate.

- The combined effect of the above factors was to lead to inflation rates in the 3 to 5 per cent range, and to increase the rate of unemployment associated with each rate of inflation. In the absence of the external price shocks of 1972-1974, the inflation rate, although it would have continued to increase, would not likely have reached double-digit levels, and most likely could have been reduced by less expansive aggregate demand policies.
- The initial effect of the 1972-1974 price shocks was to directly raise the rate of inflation. This led to higher wage demands, partly because of attempts to maintain real wages and partly also because of expectations of future higher rates of inflation. The result was a secondary wage-price spiral.
- Since 1975 the rate of inflation calculated by excluding food and energy from the CPI has been declining. The aggregate rate of inflation, however, except in 1976, has not performed as well because of extremely large increases in food prices. The depreciation of the exchange rate has also contributed to the maintenance of higher rates of inflation. The resulting high inflation rates for 1977 and 1978 are likely to be an important factor sustaining high inflationary expectations, and potentially, therefore, leading to renewed high wage demands early in the post-controls period.
- For the medium term a good food price performance, together with wage and price restraint in both the private and public sectors, would permit a sustained deceleration in the rate of inflation. Such a deceleration would facilitate the achievement of higher rates of growth. Renewed high wage and salary demands could nullify these opportunities.
- The possibility of a re-acceleration of inflation in the U.S. increases the necessity for wage and salary restraint, and for restraint in the setting of prices, in all sectors of the economy. To a certain extent a strengthening exchange rate would provide some opportunity to insulate Canada partially from higher U.S. inflation, but only at the cost of lower output growth. With restraint in price and wage-setting behaviour, this cost can be minimized.
- Without the evolution of wage and price-setting behaviour consistent with the achievement of declining rates of inflation, pressures could mount for governments to fight inflation through restrictive aggregate demand policies. A major dilemma for policy makers is that restrictive aggregate demand policies tend to reduce inflation only slowly and at the expense of foregone real growth.



### 3. CANADA'S INFLATION: AN HISTORICAL OVERVIEW

This section surveys Canada's inflation record since the Korean War. Three distinct periods stand out. There is, first, the long period of relative price stability, between 1953 and 1965, during which prices rose on average about 1.5 per cent per year. This was followed by a seven-year period, 1966 through 1972, during which the average annual rate of inflation rose to a new plateau close to 4 per cent. Finally, there is the period 1973 to the present, during which prices increased on average over twice as fast as they did over the previous seven years, and reached double-digit levels in doing so.

Between 1953 and 1965, the annual rate of inflation, as measured by changes in the CPI, ranged between -0.9 per cent and 3.7 per cent. On average, prices rose only 1.5 per cent per year over the period. Food and energy prices were eventually to play a central role in the inflation of the 1970s; however, between 1953 and 1965 food prices increased by only 1.6 per cent on average, while energy prices neither increased nor decreased. The favourable supply situation for food and energy during this early period may have been an important stabilizing factor.

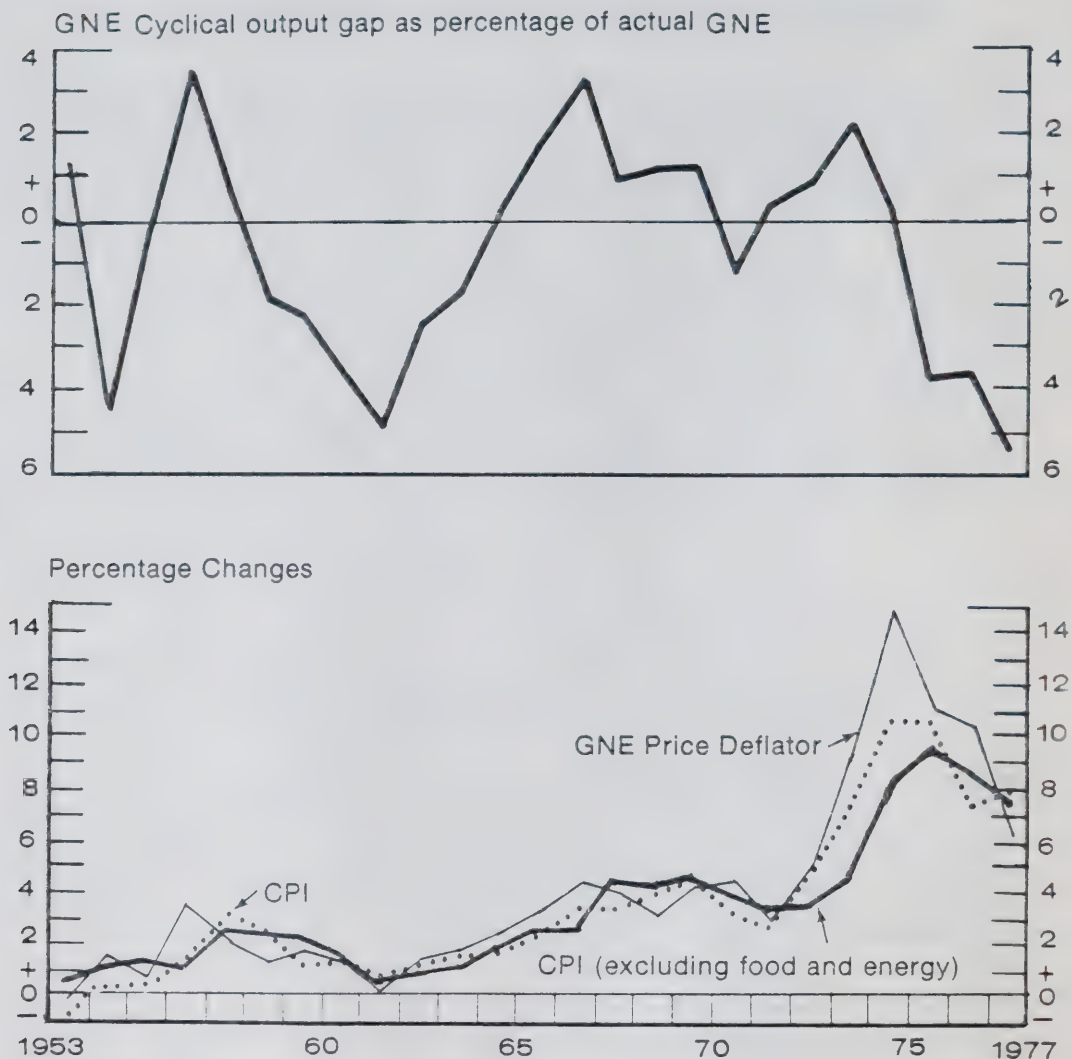
Changes in food and energy prices are not unrelated to macro-economic events; however, these price changes tend to be most closely related to by variations in supply. The consumer price index excluding food and energy components provides a measure of prices whose movements are more closely related to changes in the general level of economic activity. According to the CPI excluding food and energy, the annual inflation rate rose to 2.6 per cent in 1957, the year following the 1956 peak in economic activity. During the following slowdown in real growth, the inflation rate fell steadily to a low of 0.7 per cent in 1961, the year in which the GNE gap reached its maximum (see Chart 1). The economy subsequently entered a strong recovery in the first half of the 1960s, reaching a peak in 1966. From 1962 to 1966, the annual inflation rate increased in every year, reaching a level of 2.9 per cent in 1966.

Wage and salary behaviour was closely related to fluctuations in economic activity during this period. Compensation per employed person in the commercial non-agricultural sector rose 6.6 per cent in 1956. The rate of increase subsequently fell to 5.0 per cent in 1957 and continued to decline to a low of 2.6 per cent in 1962. By 1965 average compensation was once again rising by slightly over 5 per cent.

Between 1965 and 1966, increases in compensation per employed person in the commercial non-agricultural sector of the economy jumped from 5.3 per cent to 7.2 per cent, while between 1966 and 1967 the rate of inflation (as measured by the CPI excluding food and energy) jumped from 2.9 per cent to 4.5 per cent. Subsequently a new inflation plateau was established, as annual increases in the CPI excluding food and energy ranged between 3.3 per cent and 4.7 per cent in each of the six years from 1967 to 1972, and increases in compensation per employed

Chart 1

GNE Cyclical Output Gap, and Percentage Changes in the Consumer Price Index (total, and excluding food and energy components) and the GNE Price Deflator, Canada, 1953-1977.



Source: Statistics Canada, National Income and Expenditure Accounts, cat. 13-201, and the Consumer Price Index, cat. 62-001; and the Long Range and Structural Analysis Division, Department of Finance.



person remained between 6.4 and 7.4 per cent over the same period. Thus, the period 1966-1972 witnessed a ratcheting up of the inflation rate. What needs to be explained is not just the increase in inflation in 1966-1967, but also the persistence of this higher inflation until 1972.

The high level of aggregate demand was undoubtedly a major factor contributing to the increase in inflation in 1966-1967. The unemployment rate in 1966 stood at 3.6 per cent, and real GNE was considerably above its cyclically-adjusted level (see Chart 1). At the same time, money supply growth had been increasing steadily since 1961, and by 1967 was increasing at an annual rate close to 10 per cent (see Chart 2). Not surprisingly, such a high level of economic activity exerted strong upward pressures on wage and price increases. Added to these aggregate demand pressures were a number of highly visible public sector wage settlements and significant increases in labour militancy and strikes.

The failure of inflation to decline after 1967 can be attributed to a number of factors. Although there was a slowdown in real growth and in money supply growth after 1966, the economy nevertheless continued to operate at fairly high levels of economic activity until the slowdown of 1970. It can be seen in Chart 1 that real GNE remained above its cyclically-adjusted level throughout the second half of the 1960s, and barely dropped below it in 1970. This was in contrast with historical experience, as previous cyclical peaks, such as those in 1953 and 1956, were followed almost immediately by substantial declines in rates of real growth. In the absence of a pronounced cyclical slowdown, a momentum was established in wage settlements as contracts becoming due at different dates were settled on the basis of the experience of the recent past. As the stability of the higher rates of inflation became established over the period, these higher rates apparently became incorporated into higher inflationary expectations of both workers and firms.

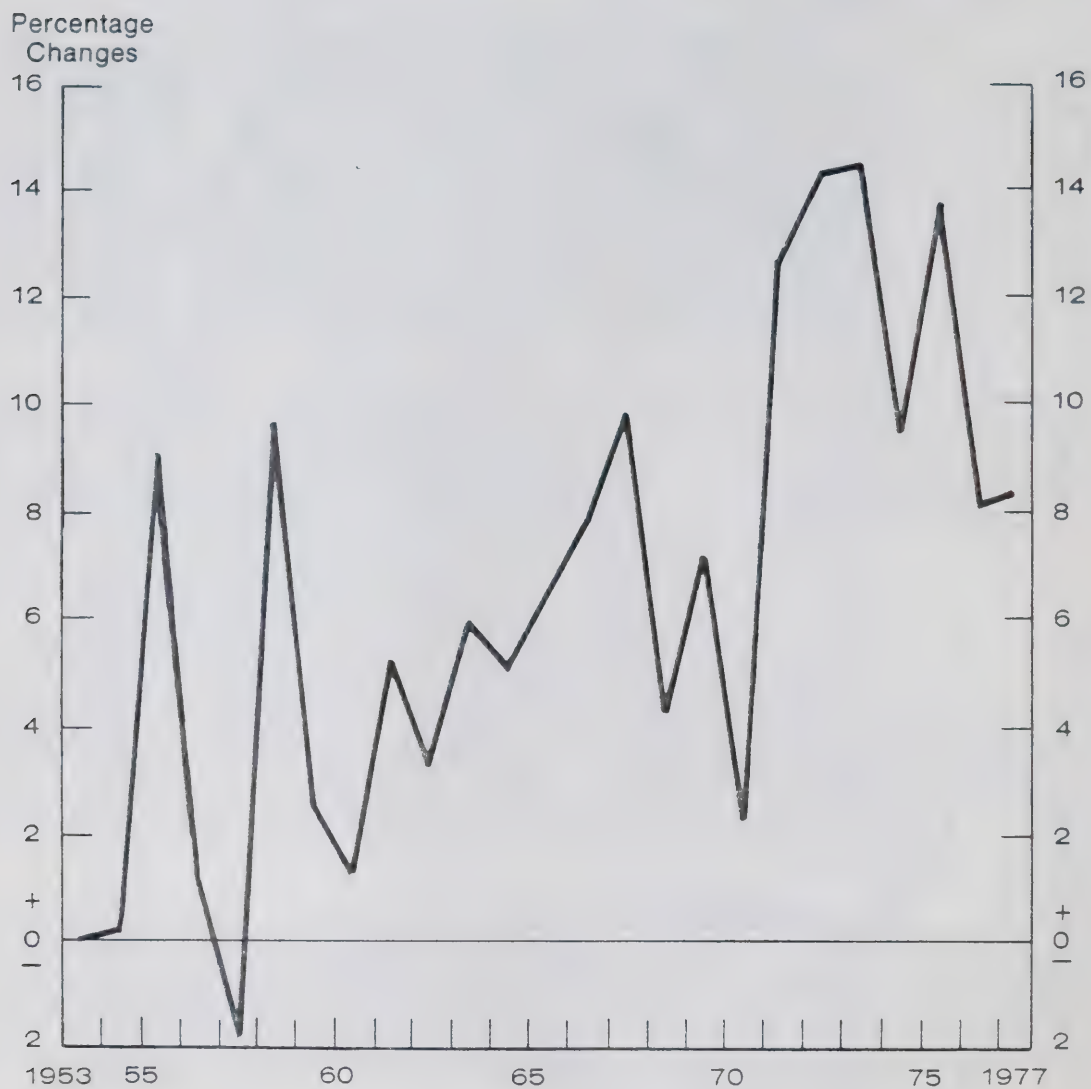
Also of critical importance was the fact that the American economy, under the influence of the Vietnam War, was experiencing high levels of demand and rising inflation. Canada operated under a fixed exchange rate until 1970, and this virtually guaranteed that Canada's inflation would follow that of the United States fairly closely. Indeed, Canada's inflation rate was always within one percentage point of the U.S. rate throughout the 1960s.

The year 1970 was one of slow growth for Canada as well as for most other western industrial economies. The global response to this period of slow growth was the adoption of highly expansionary aggregate demand policies which, in combination with special factors on the supply side, led to the world commodity price explosion of 1972-1974 and to the start of a new inflation era.

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<sup>1</sup> An excellent survey of the international inflation experience in the 1970s is provided in Towards Full Employment and Price Stability, OECD, June 1977 (by Paul McCracken et al.) See also Economic Report of the President, Washington 1978, pp. 96-137.

Chart 2  
Percentage Changes in the Money Supply (M1), Canada,  
1953-1977.



Source: Bank of Canada, Bank of Canada Review.



Table 2 sets out the rates of growth of money supply, real GNE and consumer prices over selected periods for ten industrial countries. For most countries, but particularly for Canada, the very rapid rates of growth of the money supply between 1970 and 1973 were a striking feature of this period as compared with the expansion of 1961-1966 (see also Chart 2). Fiscal policies in Canada and many other countries were also extremely expansionary between 1970 and 1973.

Table 2

Average Annual Percentage Changes in Money Supply,  
Real GNE, and Consumer Price Indexes,  
Selected OECD Countries, Selected Periods, 1961-1975

Country	Narrowly Defined Money Supply (M1)		Real GNE		CPI
	1961-1966	1970-1973	First half 1972	to First half 1973	1972-1975
Canada	5.6	14.2	6.9		9.7
United States	3.4	7.2	6.6		8.8
Japan	17.8	23.6	12.2		15.8
France	11.5	12.2	6.1 <sup>(1)</sup>		10.9
Germany	6.3	8.8	5.8		6.6
Italy	13.6	20.0	3.5		15.6
United Kingdom	NA	11.4	7.1 <sup>(1)</sup>		16.3
Belgium	7.4	11.3	6.8 <sup>(3)</sup>		10.8
Netherlands	8.3	10.6	5.9 <sup>(3)</sup>		9.3
Sweden	8.2	9.0 <sup>(2)</sup>	4.0 <sup>(1)</sup>		8.8

(1) Gross domestic product

(2) Currency in circulation plus sight deposits at commercial banks

(3) Total industrial production

Source: OECD, Main Economic Indicators, Historical Statistics, 1960-1975.

Table 2 also shows that rapid growth in the world's money supply was followed with a lag by an increase in output growth and then by an increase in inflation. Between the first half of 1972 and the first half of 1973, real GNE rose at rates of 6 per cent or more in many industrial countries. Under the most favourable circumstances, such high growth would have caused prices of many goods and services to increase. This is particularly true in the case of prices of raw

materials and other basic commodities. The supplies of such commodities cannot generally be increased very rapidly, owing to the long lags involved in the planting of agricultural commodities and in the development of new mines in the case of metals. In some cases inventories may be sufficient to accomodate rapid demand growth without major price increases, but in the case of a general world-wide increase in demand, upward pressures on commodity prices are likely to be felt rather quickly.

This was certainly the case in the 1972-1974 period (see Table 3). While the explosion in commodity prices was in part due to rapid world monetary and demand growth, a number of special factors on the supply

Table 3

Annual Percentage Increases in Selected Commodity Prices, 1972-1977

Major Groupings	1972	1973	1974	1975	1976	1977
Food	13.1	39.1	54.5	-10.2	7.5	37.5
Other Agriculture	24.5	76.1	2.9	-16.2	17.9	6.0
Metals and Minerals (Excluding Petroleum)	1.9	34.9	36.1	-9.0	4.6	7.9
Petroleum	15.0	42.4	261.1	9.9	7.0	8.4
Total	12.9	47.9	33.7	-11.5	9.3	22.8

Selected Commodities

Wheat	11.5	106.5	41.6	-13.1	-18.0	-22.0
Rice	15.1	132.9	54.8	-33.2	-30.0	7.1
Maize	-4.3	74.5	34.9	-9.3	-6.0	-14.9
Sugar	25.0	15.5	187.1	-18.1	-43.0	-31.6
Coffee	9.6	24.6	6.4	-1.2	119.0	68.5
Cocoa	20.3	100.0	51.7	-24.1	47.0	100.7
Tea	0.0	1.0	32.0	-1.6	11.0	74.8
Beef	9.9	35.3	-21.1	-16.2	-18.0	8.5
Copra	-25.8	151.5	87.4	-61.1	7.0	46.7
Palm Oil	-16.8	72.8	77.7	-35.1	-6.0	29.8
Cotton	5.9	65.6	6.3	-16.4	42.0	-7.0
Jute	4.9	-3.8	22.5	4.8	-20.0	8.8
Rubber	1.2	95.2	9.9	-23.6	32.0	5.3
Logs	24.8	94.4	-9.0	-6.3	37.0	2.2
Copper	0.0	65.5	15.8	-39.8	13.0	-6.2
Iron Ore	-4.7	33.4	14.7	14.7	-4.0	-1.0
Tin	7.6	28.1	70.6	-16.5	11.0	41.4
Lead	19.0	42.9	37.6	-29.9	7.0	38.3
Zinc	22.1	126.1	45.2	-40.0	-4.0	-16.7
Aluminum	-8.9	-4.9	36.1	16.7	11.0	16.2

Source: National Institute of Economic and Social Research, National Institute Economic Review, Quarterly; International Bank for Reconstruction and Development, World Economic and Social Indicators, Monthly.



side greatly reinforced the upward movement in prices. There was a series of crop failures at a time when food stocks were at particularly low levels. The availability of cheap credit facilitated speculation, and as inflation accelerated there was a widespread movement out of money and into land and commodities, thereby increasing commodity prices still further. On top of all of these factors came the formation of the Organization of Petroleum Exporting Countries (OPEC), and the large increase in oil prices in 1973 and 1974.

It is clear, then, that the acceleration of world inflation in 1972-1975 can be explained in part by expansionary aggregate demand policies and rapid real growth. As would be expected, acceleration of world money supply growth was followed by a surge in real growth and then by an acceleration of inflation, led by the price increases of basic commodities. However, while the general trends are consistent with the theory, the extent of the price explosion was seriously exacerbated by unfavourable price shocks - the large increases in food and energy prices.

The Canadian experience followed these world trends very closely. Canada's rapid rates of monetary expansion in 1971-1973, the Canadian boom of 1972-1973, the rise to double-digit inflation as a result of the rise in energy and food prices, and the slowdown in growth after 1973 were events which followed closely the experience of the rest of the world.

Having adopted a flexible exchange rate in 1970, Canada was not obliged to pursue such an expansionary monetary policy over the following three years. Several factors may have contributed to the decision to follow expansionary monetary as well as expansionary fiscal policies. In common with other countries there was a desire to resume rapid growth following the slowdown in 1970-1971. Important economic indicators at that time were, moreover, misinterpreted. First, changes in the relationship between the aggregate unemployment rate and labour market tightness were occurring over this period, but their effects were not fully recognized. Amendments to the unemployment insurance regulations in 1971 and continuing demographic and labour force changes meant that the unemployment rate at which inflationary pressures would begin was higher than it had been in the 1960s. In 1970 the unemployment rate stood at 5.9 per cent and rose in 1971 to 6.4 per cent. In both years the unemployment rate was only about a half a percentage point above the cyclically-adjusted unemployment rate. In 1961, by contrast, there had been a difference of almost 2.5 percentage points between the actual and cyclically-adjusted unemployment rates.

As well, initial estimates of the real growth of the Canadian economy during this period were consistently too low, as subsequent revisions to national accounts data have shown. Growth in 1971 was particularly badly underestimated. First estimates showed real GNE growing by 5.4 per cent in 1971; subsequent revisions have raised the real growth estimate for that year to 6.9 per cent (see Table 4). In addition, initial quarterly GNE estimates indicated that the economy had experienced a recession in 1970-1971 (a recession being defined technically as two successive quarterly declines in real GNE); subsequent revisions have eliminated that recession. Had allowance been made for structural changes in labour markets in interpreting unemployment rates, and had better estimates of the patterns and rates of aggregate growth been available in the early 1970s, demand management policies might have been less expansionary.

Table 4

Comparison Between First and Revised Estimates  
of Real GNE Growth, Canada, 1971-1977

	<u>First Estimate</u> (per cent)	<u>Revised Estimate</u> (per cent)
1971	5.4	6.9
1972	5.5	6.1
1973	7.1	7.5
1974	3.7	3.6
1975	0.2	1.3
1976	4.6	5.5
1977	2.6	2.7

Source: Statistics Canada, National Income and Expenditure Accounts, Cat. 13-201.

In retrospect it is clear that aggregate demand policy in the period 1971-1973 was excessively expansionary. Even so, inflation would probably not have reached double-digit rates. It was the large increases in food and energy prices which pushed the economy to double-digit rates of inflation. The sustained high rates of inflation during the mid 1970s have in turn left a legacy of high inflationary expectations, despite unemployment rates that have risen above 8 per cent.

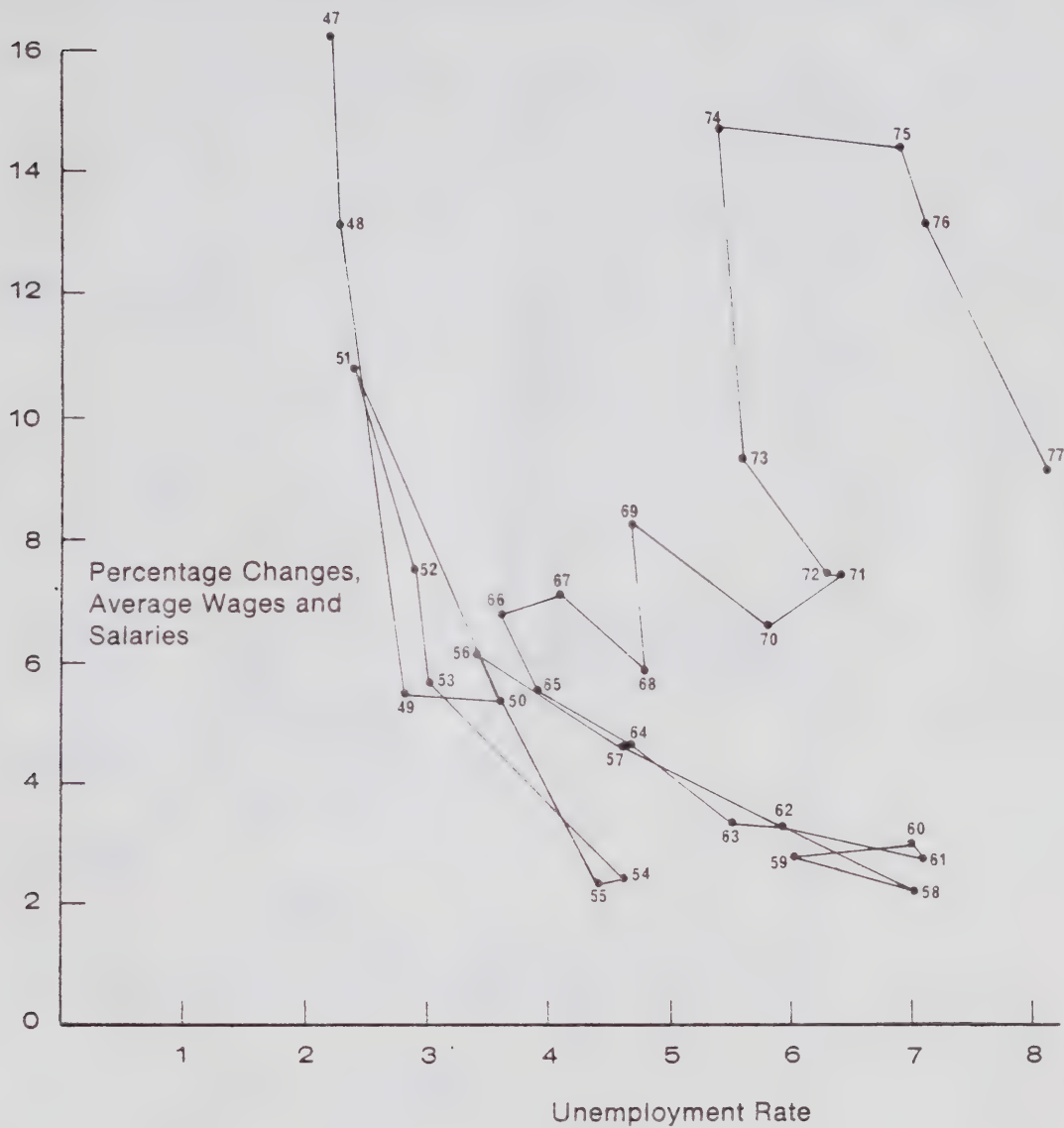
An alternative and useful way of viewing Canada's postwar inflation experience is to plot the unemployment rate against measures of wage and salary changes and price changes. Chart 3 presents the relationship between the unemployment rate and the rate of increase of wages, salaries and supplementary labour income per paid worker. In Chart 4 the rate of inflation as measured by the CPI is plotted against the unemployment rate. Looking first to the relationship between the rate of change of wages and the unemployment rate it is possible to see why economists thought there was a stable trade-off relation between wage change and the unemployment rate, at least up until 1966. High rates of wage change were associated with low unemployment rates and vice versa. A similar relationship is also apparent between the unemployment rate and the rate of price change, although it is not as strong.

Between 1966 and 1972 neither the rate of change of wages nor the rate of change of prices showed a tendency to decline despite significant increases in the unemployment rate. Between 1972 and 1975 there were significant increases in both measures of inflation, despite relatively small decreases in the unemployment rate. Finally, the rates of change of wages and prices in 1977 continued to exceed 1971 levels even with substantially higher unemployment rates.



Chart 3

The Aggregate Unemployment Rate, and Percentage Changes in Average Wages and Salaries, Canada, 1947-1977\*

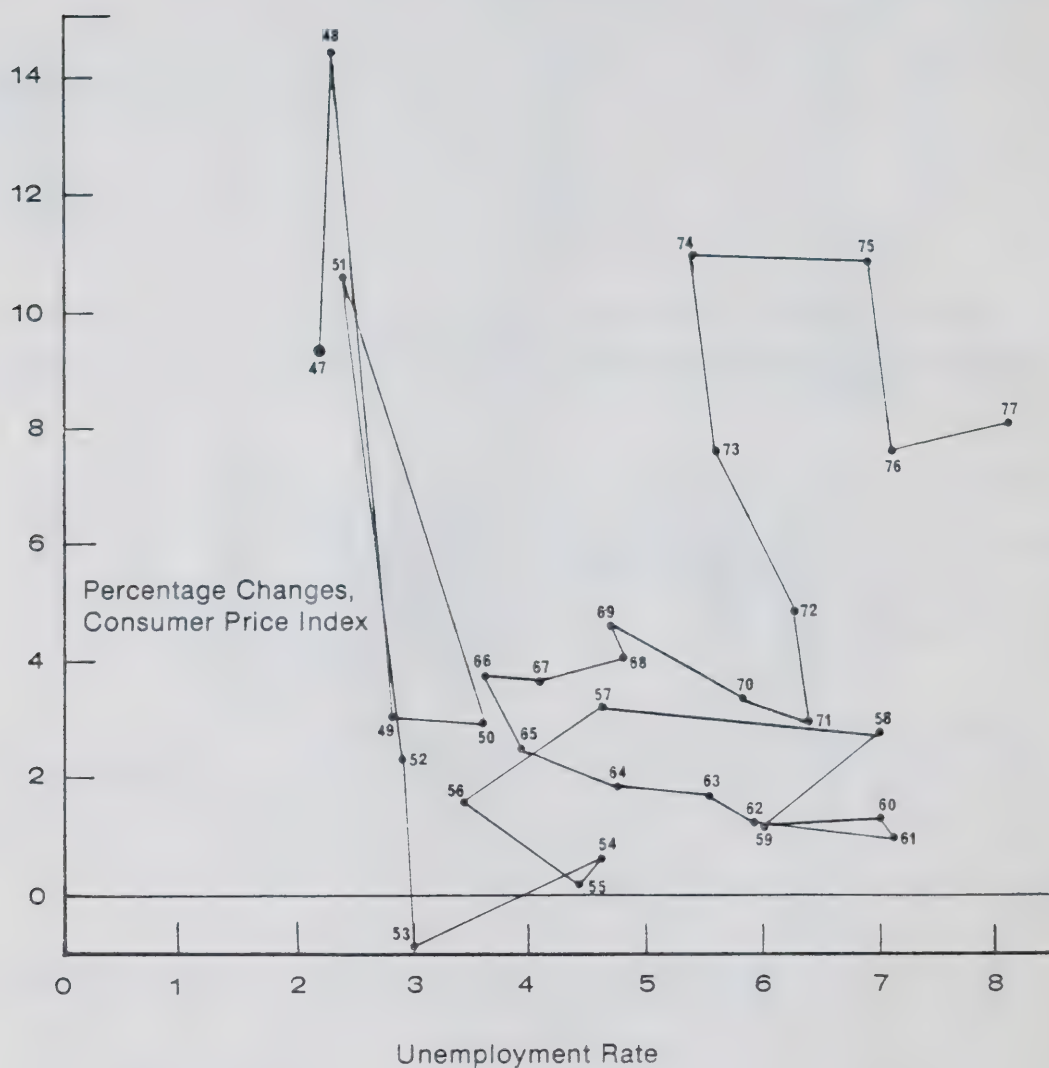


\*Labour Income per Paid Worker

Source: Statistics Canada, National Income and Expenditure Accounts, cat. 13-201, and The Labour Force, cat. 71-001.

Chart 4

The Aggregate Unemployment Rate, and Percentage Changes in the Consumer Price Index, Canada, 1947-1977.



Source: Statistics Canada, The Consumer Price Index, cat. 62-001, and The Labour Force, cat. 71-001.

The following section briefly describes a theoretical model of inflation which offers an explanation of the inflation-unemployment patterns shown in Charts 3 and 4. This includes a discussion of the role of inflationary expectations and price shocks in generating inflation, and as well a discussion of how structural changes in the labour market may have affected the observed behaviour of inflation and unemployment.





#### 4. THEORY OF INFLATION

"All inflation is a monetary phenomenon." Few economists today would dispute this proposition, advanced by what is called the monetarist school of economics, and now accepted<sup>1</sup> widely in the economics profession and in many parts of society. Over the long run, high rates of inflation cannot be sustained without accommodating growth in the money supply, nor can high rates of growth in the money supply persist without being accompanied by high rates of inflation. There is a broad consensus that in the long run, lower rates of inflation must be accompanied by lower rates of growth in the money supply.

The monetarist proposition has its greatest applicability to a growing economy in which the labour force is "fully employed". In such a situation the rate of growth of real output is determined by the growth of population, the participation rate of the working-age population, productivity growth and capital accumulation (i.e., the savings rate of the economy). Real growth in the economy may be considered to be independent of the growth of the money supply.<sup>2</sup>

In this theory, there is no long-run trade-off between the rate of inflation and the rate of unemployment. There is, rather, a unique non-accelerating-inflation rate of unemployment (NAIRU), determined by technology, labour market behaviour and institutional arrangements, which is consistent with any rate of inflation. The rate of inflation is determined by the rate of growth of the money supply.<sup>3</sup> The modern theory of inflation rejects the view held in the early 1960s that it is possible for an economy to have permanently lower rates of unemployment at the expense of a stable, higher rate of inflation.

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<sup>1</sup> For excellent recent reviews of the theoretical literature on the causes of inflation and unemployment see Robert J. Gordon, "Recent Developments in the Theory of Inflation and Unemployment" J. Monetary Econ., 2, 1976, 185-219; Helmut Frisch, "Inflation Theory 1963-1975: A Second Generation Survey", J. Econ. Lit.; Dec., 1977, 15, 1289-1317; Anthony M. Santomer and John J. Seater, "The Inflation-Unemployment Trade-off, A Critique of the Literature" J. Econ. Lit., June, 1978, 16, 499-544; David Laidler and Michael Parkin, "Inflation - A Survey", Econ. J., Dec. 1975, 85, 741-797.

<sup>2</sup> It is possible that in the long run high rates of inflation may reduce the long-term rate of growth because of their possible adverse effects on investment planning, and their tendency to cause distortions in a variety of markets. This possibility is ignored here.

<sup>3</sup> Strictly speaking, the rate of change of the velocity of money will also determine the long-run rate of inflation.

The modern theory of inflation holds that, in the short and medium term, it is possible to trade off periods of unemployment below or above the NAIRU for changes in the momentum of inflation. For example, according to this theory it is possible for the economy to move to an unemployment rate below the NAIRU and in doing so experience higher rates of inflation. It will not be possible, however, to maintain this lower unemployment rate unless the economy is prepared to accept not simply a higher rate of inflation but rather accelerating rates of inflation, if indeed it is possible to maintain the lower unemployment rate at all. Furthermore, the experience would leave the economy with a higher momentum of inflation once the economy moved back up to the non-accelerating-inflation unemployment rate.

The modern theory of inflation places great emphasis on the adjustment process by which the economy moves to different rates of inflation. It is quite possible that, during the adjustment process, both the unemployment rate and the inflation rate may be rising. This has been the case in several recent years. It is also possible that a decrease in the unemployment rate from high levels might be accompanied by a decline in inflation.

For the most part economists do not disagree on the nature of the adjustment process. Differences of opinion relate primarily to empirical questions such as the speed of the adjustment process and the extent to which the adjustment process involves changes in real output or changes in prices. It is, nevertheless, these differences of opinion on empirical issues which lead to different policy prescriptions.

The following sections describe briefly some of the main factors underlying the short and medium-term inflation-unemployment trade-off. The first section reviews the relationship between labour market tightness and wage and price increases. This relationship was fundamental to analysis of the permanent trade-off curve believed to exist in the early 1960s, and still remains an integral part of modern inflation theory. The second section examines the role played by inflationary expectations. Inflationary expectations systematically shift the short-term trade-off, and provide the dynamic mechanism which reduces or eliminates the trade-off in the longer run. Inflationary expectations and the short-term relationship between inflation and unemployment are critical factors determining the medium-term inflation-unemployment trade-off for the economy. The third section examines the role of price shocks and relative price changes in the inflation process. This issue is discussed separately because of the importance of the large increases in food and energy prices in the early 1970s in leading to Canada's double-digit inflation. The final section briefly examines the effect of structural changes in the labour market on the short-term trade-off and also on the long-run full-employment unemployment rate.

#### 4.1 The Short-Term Inflation-Unemployment Trade-Off

Underlying the short-term trade-off curve is a relationship between the rate of change of nominal wages and the degree of "labour market tightness" in the economy. According to this relationship wages are bid up as the economy expands and the unemployment rate falls; conversely, at higher rates of unemployment the rate of wage increase declines. With prices determined by a mark-up on labour costs, increases in the rate of growth of wages lead, in turn, to higher rates of inflation.



Not all price increases have their origins in domestic wage increases. It is because of this that the relationship between the rate of inflation and the unemployment rate (Chart 4) is not as "close" as the relationship between the rate of wage change and the unemployment rate (Chart 3). Certainly, for many goods and services, labour costs make up the largest part of total costs and are the primary determinant of prices. Even in these cases, the mark-up on labour costs may not be constant but may change in response to other factors. There are, as well, many goods and services whose prices may be determined independently of wage behaviour. For example, in the case of agricultural products, demand factors and supply constraints may be more important than wage costs in determining prices. The charges for a variety of government services often have little relationship with underlying wage and salary costs. As well, increases in the prices of tradeable goods or changes in the exchange rate can also lead directly to higher rates of inflation. It is quite possible to have rising rates of inflation despite a deceleration in wage increases. Nevertheless, increases in the rate of inflation stemming from these sources can eventually lead to higher wage and salary demands and further increases in prices. The process by which this may happen is described in the following sections.

A critical issue both in the early 1960s and today is how "flat" the short-term trade-off curve is. The overall flatness or steepness of the short-term trade-off curve reflects the sensitivity of wage changes to the unemployment rate, or in other words by how much the rate of wage change will be reduced if the unemployment rate rises, and how quickly wage increases will accelerate if the unemployment rate falls. Whatever the overall sensitivity, it is likely that the curve is steeper at low rates of unemployment than at high unemployment rates. This means that at a high rate of unemployment further increases in the unemployment rate have little effect in the short run on wage change, but at low rates of unemployment the effect is stronger.

The sensitivity of wage changes to changes in the unemployment rate depends on many factors. For example, in some sectors of the economy wages are determined primarily by slowly changing institutional relationships, internal to the firm, reflecting primarily the desires of both managers and workers for security and stability. General labour market conditions, as measured for example by the unemployment rate, may have little influence on wage demands and negotiated settlements in these situations. Also, wage relativities are extremely important. Some leading sectors establish the pattern for wage settlements and other sectors follow this pattern independently of labour market conditions.

#### 4.2 Price Expectations and Inflation

A most important refinement to inflation theory over the last ten years has been the introduction of inflationary expectations as an important factor determining wage and salary demands and the rate of price increase.<sup>1</sup>

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<sup>1</sup> See Milton Friedman, "The Role of Monetary Policy", Amer. Econ. Rev., 58, March 1968, 1-17, and E.S. Phelps, "Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time", Economica 34, August, 1967, 254-281.

Workers are concerned with their real wage and their real standards of living and wage and salary demands will, as a result, be heavily influenced by expectations about the future behaviour of prices. Expectations that prices will increase more quickly in the future will lead to higher wage and salary demands regardless of the degree of labour market tightness in the economy. Moreover, if firms expect the prices of their products to rise in the future, they will be willing to pay correspondingly higher money wages.

Differences in views on the factors affecting inflationary expectations and the speed with which expectations can be altered underlie many policy disagreements. The process by which individuals formulate expectations with respect to inflation is not perfectly understood. A reasonable proposition is that expectations of future price increases are likely to depend critically on past rates of inflation. For example, over the period 1953 to 1965 the average annual rate of inflation in Canada was only 1.5 per cent. Moreover, for ten of these thirteen years, the year-to-year increase in prices was less than 2 per cent. Such a long period of relative price stability probably resulted in fairly low inflationary expectations, which were then reflected in moderate wage and salary demands. In the following seven years, 1966 to 1972, the average annual rate of inflation more than doubled, and then, partly as a result of external price shocks, more than doubled again between 1973 and 1977. The effect of this accelerating inflation over the last ten years has likely been to cause significant increases in expected rates of inflation, and thus increases in wage and salary demands.

An alternative view is that individuals formulate their expectations about price changes in a more sophisticated manner. For example, it may be that people respond to high rates of unemployment by lowering their inflationary expectations because they believe that high rates of unemployment will reduce the rate of inflation. Further, wage earners may respond to government policy initiatives. If they believe that these initiatives (e.g., an increase in the money supply) are inflationary they will act as if the rate of inflation were going to increase. This view is dependent upon a belief that society is made up of fairly sophisticated economic actors, aware of economic theory and the implications of government policies.

When an allowance for inflationary expectations is included in the wage-determination process there is no longer a unique short-term trade-off between inflation and unemployment. Rather there is a short-term trade-off for each expected rate of inflation. It is because of this that the short-term trade-off is highly unstable. As the expected rate of inflation rises the short-term trade-off shifts out from the origin of the inflation-unemployment rate axes. Conversely, as the expected rate of inflation falls the short-term trade-off curve shifts inwards towards the origin. This latter process would permit a simultaneous reduction in inflation and unemployment rates.

In the long-run equilibrium, at the non-accelerating-inflation unemployment rate the expected and actual rates of inflation are equal and determined by the rate of growth of the money supply. During periods of rapid growth when the economy is operating near or below the NAIRU, and



prices are rising, inflationary expectations are adjusted up in response to the higher rates of inflation, thereby leading to further increases in wage and salary demands. Conversely, when the economy is operating above the NAIRU, with falling rates of inflation, inflationary expectations also decline, reinforcing the deceleration of inflation.

Knowledge of the slope of the short-term inflation-unemployment trade-off and the speed of adjustment of inflationary expectations is critical for the purpose of formulating policy. If inflationary expectations adjust very quickly to rising prices then the expansion of aggregate demand will affect prices more than output and employment. Conversely, slower demand growth will lower the rate of inflation and have smaller effects on output and unemployment. If the short-term curve is fairly flat and expectations adjust only very slowly then it may be possible to achieve substantial output and employment gains with slowly accelerating rates of inflation. At the same time, however, the subsequent reduction of the rate of inflation might require slower rates of growth over a fairly long period of time. An important issue for the medium term is, therefore, how fast inflationary expectations change and what are the most efficient means for changing them.

#### 4.3 The Role of Price Shocks and Relative Price Changes in Generating Inflation

The above sections described briefly the role of aggregate demand and inflationary expectations in generating inflation. To a large extent, these factors can provide a satisfactory explanation of the inflation-unemployment adjustments up until the early 1970s, that are depicted in Charts 3 and 4. In recent times, however, large price shocks have been imposed on the Canadian economy from abroad. During the first half of the 1970s rapid growth in many industrialized economies and high demand for commodities with inelastic supplies resulted in extremely rapid increases in the world prices of many commodities. At the same time crop failures drove food prices up at an unprecedented rate and the price of oil was dramatically increased by OPEC.

These price shocks and relative price changes were significant not only because of their size but also because they came at a time when Canada was already in the process of adjusting to higher rates of inflation. It is worth describing, therefore, how such exogenous shocks can influence inflation.

As an example, consider a large relative energy price increase, such as that which occurred in 1973 and 1974. If wages and prices in the economy are perfectly flexible, an energy price increase does not necessarily lead to a higher aggregate rate of inflation. With unchanged nominal income, a higher volume of spending on energy because of the relative price increase can result in reduced spending on other goods and services, which in turn puts downward pressure on their prices.

Wages and prices, however, are not perfectly flexible. In many sectors of the economy there is a resistance to reducing prices. The immediate response to reduced demand for non-energy goods and services may be reductions in output rather than prices. Consequently, the initial result of an energy price increase can be an increase in the rate of inflation for a given unemployment rate.



There may also be a secondary round of inflationary effects resulting from a major energy price increase and the imperfect flexibility of prices. Higher rates of inflation lead to higher inflationary expectations, which in turn lead workers to attempt to obtain higher money wages and salaries. While firms which do not benefit from the relative price change might resist these wage demands to some degree, it is likely that workers will succeed in obtaining some increase in wages.

#### 4.4 Structural Changes in the Labour Market

Factors which alter the structure of labour markets to increase the degree of labour market "tightness" implied by a given measured unemployment rate will be reflected in a worsening of the short-term trade-off. In certain periods, a 5 per cent unemployment rate may have implied neither upward nor downward pressure on the rate of inflation. If the unemployment rate were above that level, there would be downward pressure on the rate of inflation; if it fell below it, there would be upward pressure. The unemployment remaining at this unemployment rate would be the result of frictional and structural factors and, therefore, would not be responsive to changes in aggregate demand.

Changes in labour market behaviour, and changes in institutional arrangements, can alter the unemployment rate at which upward pressure on wages and prices begins. For example, Canada's Economy argued that the secular rise in the unemployment rates of youths and women combined with the increasing importance of these groups in the labour force to raise the average unemployment rate likely to be experienced over the business cycle. The effect of these developments has been not only to raise the unemployment rate at which pressures on the rate of inflation emerge, but also to shift the entire short-term inflation-unemployment trade-off outwards.

There is an important difference between shifts in the short-term trade-off resulting from changing inflationary expectations and those resulting from changes in labour market behaviour and institutional arrangements. If the adjustment process generated by rising inflationary expectations is allowed to run its full course then it is possible for the initial short-term trade-off to be re-established (i.e., with lower inflationary expectations). With labour market changes, this is not the case. Such structural changes lead to permanent changes in the short-term inflation-unemployment trade-off.

#### 4.5 Summary

While it is true that in the long run inflation is a monetary phenomenon, in the short and medium term, increases in the money supply do not necessarily lead to proportional increases in the rate of inflation, nor do decreases in the money supply necessarily lead to proportional reductions in the rate of inflation. The division of nominal increases in GNE into real increases and inflation depends upon a number of factors - the unemployment rate, exchange rate changes, the flexibility of wages and prices, price expectations and the extent of shifts in relative prices. It is on the role and the importance of these factors that economists disagree. Some believe that these factors act in such a way that a reduction in monetary expansion reduces inflation fairly

quickly with only small losses in output and employment during the adjustment process. Others believe that a reduction in money supply growth reduces inflation only very slowly, after prolonged periods of low output and employment growth. It is this difference in view which leads to differences in opinion on appropriate policies.

The short-term inflation-unemployment trade-off is constantly changing in response to changing inflationary expectations. In the 1970s the combination of world price shocks, strong inflationary expectations and demographic and labour market developments led to a worsening in the short-term inflation-unemployment trade-off unprecedented in the postwar period.

The following two sections provide an empirical analysis of the factors contributing to Canada's worsening inflation-unemployment experience. In section 5, inflationary expectations, and the relationship between the extent of relative price changes and the aggregate rate of inflation, are considered. The importance of increases in non-wage-related prices in contributing both directly to inflation, and indirectly by raising inflationary expectations and wage demands, is examined. Section 6 looks at the effect of recent structural changes in the labour market on the short-term trade-off. The changes reviewed include the rapid growth of the youth and adult female labour forces, the 1971 changes in the Unemployment Insurance Act and the increasing importance of multi-earner families.





## 5. THE ROLE OF PRICE EXPECTATIONS AND PRICE SHOCKS IN CANADA'S RECENT INFLATION EXPERIENCE

As the previous section explained, there is a consensus among economists that changing inflationary expectations play a crucial role in determining what adjustments in inflation and unemployment rates can be made over the medium term. Despite their importance, it is often difficult to find evidence on how expectations of inflation are formed. Section 3 described the three different periods of inflation which stand out in the Canadian experience since the Korean War: the 1953-1965 period with price increases averaging 1.5 per cent per year; the 1966-1972 period with inflation rates close to 4.0 per cent; and the post-1972 years with average annual rates of inflation in the 8.0 to 9.0 per cent range. In analyzing the transition to the higher rates of inflation in the 1966-1972 years following the relative price stability of 1953-1965, it is not clear, for example, exactly when and how price expectations changed. The fact that they did change is a deduction based on the examination of aggregate price and wage change data, and not on other direct or indirect evidence.

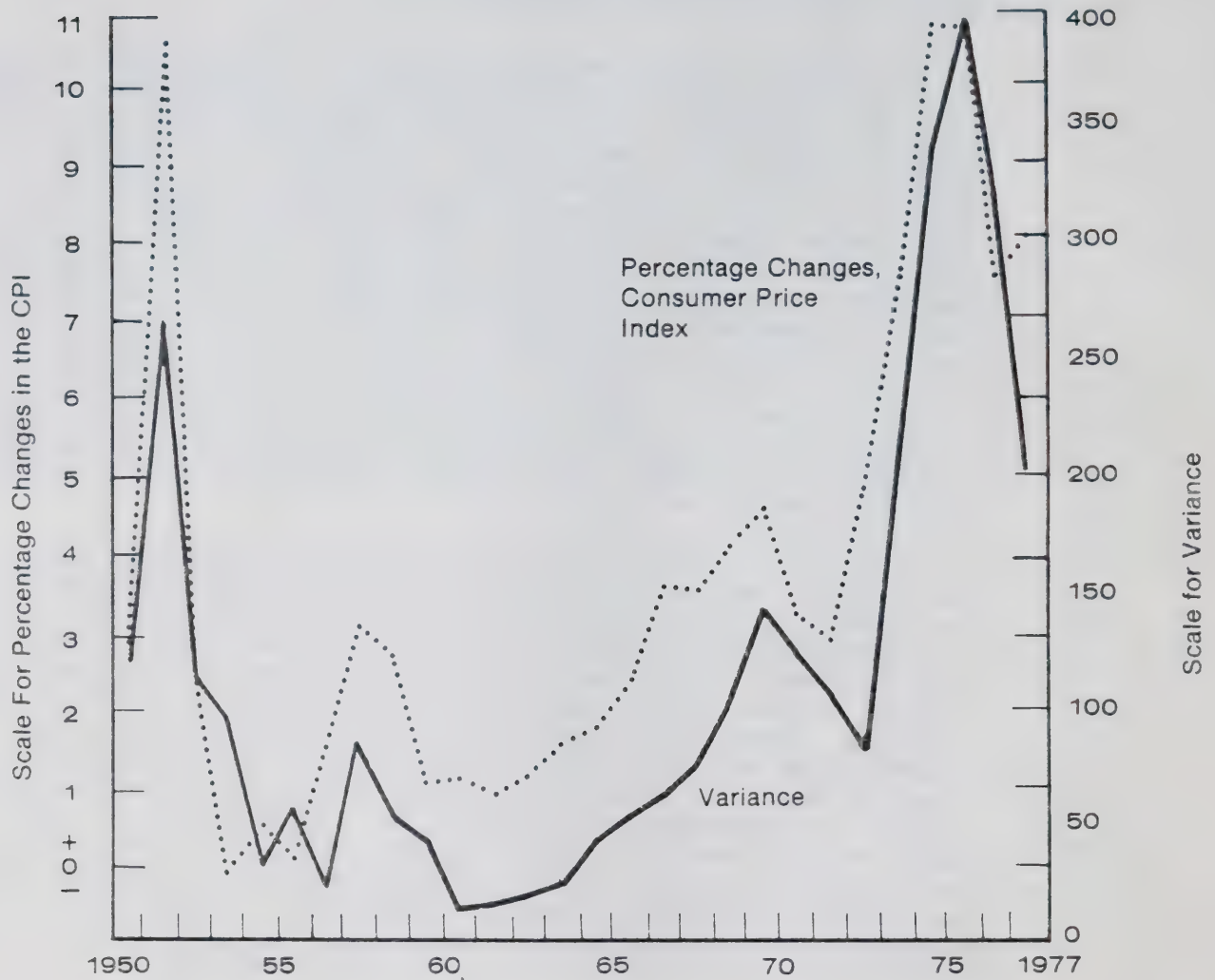
It is possible to be more precise with respect to the experience of the early 1970s. As was noted earlier, aggregate demand management policy was excessively stimulative in the early 1970s. While this policy contributed to the inflationary pressures in the economy, it is unlikely that by itself it could have caused a price surge of the extent experienced in 1973 followed by the jump to double-digit rates of inflation in 1974 and 1975. Rather, the transition to the high rates of inflation in the post-1972 period seems clearly to have resulted in significant part from the very large exogenous increases in the prices of food and energy. It appears that the dramatically higher rates of inflation which resulted from the food and energy price shocks quickly led to expectations of similar rates of price increases. As the public attempted to protect itself against expected large price increases through high wage and salary increases and, in many contracts, cost of living allowance (COLA) clauses, a secondary wage-price spiral developed.

The food and energy price increases of the period 1972-1974 were large relative price increases. In reviewing the evidence upon which the above interpretation of the post-1972 inflationary spiral is based, it is useful to begin by examining the historical relationship between relative price changes and overall rates of inflation in Canada.

Chart 5 plots the aggregate rate of inflation, as measured by the CPI, and a weighted variance of individual commodity percentage price changes about the percentage change in the average price level. The weighted variance is used as a measure of the extent of relative price change. The expenditure weight (based on 1967 quantity weights and April 1973 prices) of each commodity in the CPI was used to calculate the weighted

Chart 5

Percentage Changes in the Consumer Price Index, and in the Weighted Variance of the Components of the Consumer Price Index, Canada, 1950-1977



Source: Statistics Canada, Consumer Prices and Price Indexes, Cat. 62-010; and Long Range and Structural Analysis Division, Department of Finance.

variance. Over the post-1950 period, the two series have in general moved closely together. In the particular cases of the two high-inflation periods of 1951 and 1973-1975, the variance of prices was also very high.

Typically, commodity prices are more volatile than prices of manufactured goods and of services. Periods of large relative price changes are thus usually periods in which commodity prices have changed sharply; this was the case in the 1951 and 1973-1975 periods. Because the demand for commodities tends to be inelastic, total expenditure on commodities rises (falls) when commodity prices increase (decrease). Assuming unchanged nominal incomes, expenditures on other goods and services would fall (rise), putting downward (upward) pressure on their prices. If there were perfect price flexibility in the economy, then, increases in some prices would be offset by decreases in others. Consequently, relative price changes, as reflected in an increased variance of prices, would not be associated with any particular movement in the general price level.

As Chart 5 shows, however, this has not been the case in Canada since 1950. High rates of inflation have consistently been associated with increases in the amount of relative price change. One possible explanation is that during periods of high and rising inflation, unstable market conditions, imperfect information and uncertainty lead firms and individuals to price incorrectly, thereby increasing the amount of relative price change.<sup>2</sup> A second explanation is that inflation is led by price increases in a few initial sectors. Because of price inflexibilities in the system these price increases are not offset by declines or slower rates of increase in other prices. The result is an increase in both the amount of relative price change and the rate of inflation.

Had an accelerating general rate of inflation triggered large relative price changes, one would have expected that a very broad range of goods and services would have exhibited high rates of price change in the early 1970s. Included in this wide range of goods would be those whose prices are to a significant extent wage and salary-determined. Such would not have been the case if the second possibility cited above had corresponded more closely to what happened in the early 1970s. Rather, one would have expected to find, initially, price increases among a relatively small number of goods and services, probably those whose prices are less closely related to labour costs in the short run.

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<sup>1</sup> Similar results have been found in the United States; see Daniel R. Vining and Thomas C. Elwertowski, "The Relationship Between Relative Prices and the General Price Level", Amer. Econ. Rev., September 1976, 66, 699-708.

<sup>2</sup> For a more detailed examination of the proposition and its applicability to the U.S. experience see Richard W. Parks "Inflation and Relative Price Variability", J. Pol. Econ., 1978, 86, 79-95.



Table 5 provides annual rates of price change for several groups of goods and services - food, energy, government-provided services, insurance, and dwelling-related items - changes in the prices of which are unlikely to be linked to wage changes in the short run. The table also compares the behaviour of these prices with the behaviour of the prices of other goods and services, changes in whose prices are probably more closely related to movements in underlying labour costs.

As the table clearly shows, it was the prices of many of the items whose prices are not primarily wage and salary-determined in the short run which initially rose rapidly in the early 1970s. The food and energy components of the CPI rose at rates of 7.0 and 12.9 per cent in 1972 and 1973, respectively. However, the CPI excluding the food and energy components rose only 3.8 per cent in 1972 and 4.8 per cent in 1973, rates similar to those experienced in the 1967-1970 period. Had food and energy prices continued to rise at 1965-1971 rates, (the average yearly increase over this period was 2.9 per cent), there would have been no dramatic price surges in 1972 and 1973. The rate of increase of the CPI excluding all of the items listed in the Table 5 was 3.1 per cent in 1972 and 4.2 per cent in 1973 (see the last line of the table). Again, these are rates of increase very comparable to those of the years 1967-1970.

The food price increases of the early 1970s were by far the most important contributors to overall relative price changes. The surge in food prices which began in 1972 was attributable to a number of factors, the most important of which was a grain-supply crisis which suddenly became apparent in 1972.<sup>1</sup> Strong beef price increases stemming from the existing supply/demand situation were also an important contributor to overall food price increases. In 1973 and 1974, almost 50 per cent of the increased amount of relative price change can be explained by the food price increases; in 1975, about 45 per cent.

Chart 5 shows that in 1976 and 1977, the variance of price changes fell despite continuing high overall inflation. This reflected the spreading of inflation from the initial leading sectors into the other sectors of the economy. This process shows up clearly in the data presented in Table 5. The CPI excluding food and energy components rose by 8.1 per cent in 1974, a significant increase over the rates of change of the past decade. This group of prices rose even more sharply in 1975, by 9.7 per cent, before rates of increase eased in 1976 and 1977.

The adjustment of wages and salaries in response to the 1972 and 1973 price increases, and the expectation of future price increases, is apparent in data relating to new contracts settled during this period, and in the pattern of increases in average wages and salaries.

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<sup>1</sup> Ironically, American and Canadian grain policies had been directed to cutting down grain supplies, as a response to the high levels of the surplus stocks and low prices of the late 1960s. These supply-restriction policies were primarily responsible for reducing reserves to such a point that the poor 1972 Russian harvest and consequent Russian purchases of grains on the international market set off an unprecedented grain price spiral.

Table 5

## Annual Percentage Changes in Selected Components of the Consumer Price Index, Canada, 1965-1977

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
CPI Total	2.5	3.7	3.6	4.0	4.6	3.3	2.9	4.8	7.5	10.9	10.8	7.5	8.0
1. Food - Home Use	2.6	6.3	0.4	3.0	4.0	1.6	0.5	7.9	14.8	15.8	12.6	1.5	8.8
2. Food - Away From Home	2.9	7.2	7.5	4.7	5.9	6.3	4.5	6.2	12.8	18.7	14.3	8.5	6.1
3. Fuel Oil	0.0	-0.1	1.7	4.3	2.3	2.1	9.6	6.2	15.6	29.3	13.5	16.1	15.5
4. Motor Oil	1.5	4.6	8.8	5.3	5.3	3.8	3.8	4.8	6.9	13.8	9.9	7.7	5.4
5. Gasoline	1.5	4.3	2.4	3.6	2.5	2.2	3.5	0.8	6.8	16.6	13.1	12.4	8.6
6. Gas - Home Heat	0.2	-0.4	0.1	1.6	-0.2	-1.2	1.4	0.7	1.6	10.1	20.9	28.9	13.2
CPI - Food and Energy	2.4	5.9	1.4	3.2	4.0	2.2	1.6	7.0	12.9	16.7	13.1	4.8	8.8
CPI - Excl. Food and Energy	2.5	2.9	4.5	4.4	4.7	4.0	3.3	3.8	4.8	8.1	9.7	8.9	7.5
7. Electricity	-1.7	0.1	7.3	5.0	2.4	8.7	3.4	2.7	8.1	3.8	11.5	16.0	17.0
8. Telephone	0.4	1.2	1.4	0.6	0.2	0.5	2.7	2.8	2.9	1.4	1.9	8.0	4.7
9. Public Transportation	4.9	3.8	12.2	5.2	11.8	5.6	4.0	3.4	0.1	8.4	12.8	14.5	6.1
CPI - Items (7)-(9)	1.7	2.0	7.8	3.9	6.2	5.2	3.5	3.1	3.0	5.3	9.8	13.5	9.2
10. Dwelling Ins.	5.9	7.1	5.8	7.4	6.9	5.6	22.5	24.3	24.4	13.6	20.9	25.2	14.8
11. Household Effects Ins.	2.5	15.8	5.5	3.4	1.3	1.3	10.9	5.8	9.1	11.3	35.3	25.1	9.1
12. Auto Ins.	23.8	8.5	1.3	-2.5	2.6	9.3	7.3	4.6	3.7	8.6	19.0	21.3	6.3
CPI - Items (10)-(12)	18.8	8.9	2.3	-0.4	3.2	7.9	10.2	8.5	9.2	9.9	20.9	22.5	8.4
13. New Houses	4.8	4.6	7.1	7.0	7.7	6.5	7.6	10.6	13.2	10.6	5.6	12.3	9.2
14. Property Taxes	3.6	4.7	4.0	6.6	8.8	7.3	2.8	1.6	1.8	0.5	6.9	13.0	12.3
15. Mortgage Interest	3.4	4.3	3.8	8.9	14.1	13.5	12.2	8.7	11.3	13.0	14.7	14.2	11.0
16. Tenancy	0.7	1.7	3.3	4.5	3.9	3.5	1.8	1.5	1.7	2.9	5.5	7.1	6.3
CPI - Items (13)-(16)	1.7	0.3	4.4	6.0	7.1	6.4	5.1	4.9	6.1	6.3	8.2	10.9	9.1
17. Water Rates	-	-	-	-	-	-	-	-	2.4	10.3	5.4	13.3	11.3
18. Postage	1.6	0.0	0.0	6.1	25.7	1.1	5.4	14.7	0.0	0.0	0.0	8.3	32.8
19. Coal	1.7	0.4	3.1	3.0	5.2	5.8	8.6	3.9	5.1	0.3	-	-	-
20. Auto Registration	2.6	0.7	0.4	4.2	21.1	5.2	1.1	1.7	3.0	0.0	0.0	3.8	4.2
CPI - Items (17)-(20)	1.7	0.3	2.1	2.9	11.4	4.2	7.5	7.4	5.0	7.2	3.8	11.8	17.4
CPI - Items (7)-(20)	3.4	3.3	4.8	5.0	6.9	6.2	5.2	4.9	5.7	6.4	9.5	12.5	9.2
CPI - Excl. (7)-(20)	2.2	4.0	3.2	3.8	3.7	2.5	2.0	4.7	8.2	12.5	11.3	5.8	7.6
CPI - Items (1)-(20)	2.8	4.7	2.9	4.0	5.3	4.0	3.3	6.0	10.1	12.0	11.5	8.1	9.0
CPI - Excl. (1)-(20)	2.0	2.6	4.4	4.1	3.5	2.7	2.2	3.1	4.2	9.2	9.9	6.6	6.6

Source: Statistics Canada, The Consumer Price Index, Cat. 62-001, and Long Range and Structural Analysis Division, Department of Finance.

Table 6 provides data on the percentage of new major collective agreements which contained cost of living allowance (COLA) clauses over the eleven years 1967-1977, and on the average duration of contracts for selected years over this period. Growing expectations of larger price increases in the future should be reflected in a rising share of new settlements containing COLA provisions, and in shorter lengths of contracts which would facilitate the adjustment of wages to rising prices. Both of these effects are evident in the data given in Table 6. The percentage of new settlements containing COLA provisions rose sharply in each of 1972 and 1973, with the major jump coming in 1974. (The decline in the share of new settlements with COLA clauses in 1976 and 1977 reflected the effect of the mandatory controls program. With controls, COLA clauses afforded no extra protection against unexpectedly high price increases.)

Table 6

Percentage of Wage Settlements with Cost of Living Allowance (COLA) Clauses, and the Average Duration of Wage Contracts, Canada, 1967-1977<sup>(1)</sup>

	Per cent of Settlements with COLA	Per cent of Employees with COLA	Average Duration of Contract (in months)		
			with COLA	without COLA	Total
1967	0	0			
1968	0	0		24.9	24.9
1969	0	0			
1970	3.0	5.2	34.1	25.7	26.2
1971	6.6	4.7			
1972	14.5	35.9	43.9	23.7	31.0
1973	20.6	21.6			
1974	36.9	39.6	20.4	21.2	20.9
1975	33.7	41.3			
1976	26.3	38.3	34.8	15.7	23.0
1977	20.4	18.8	20.9	14.8	15.9

(1) Data based on bargaining units of 500 or more employees, excluding construction.

Source: Collective Bargaining Division, Labour Canada.

The average length of non-COLA contracts declined at a relatively moderate pace from 1970 to 1974. (The very short lengths of such contracts settled in 1976 and 1977 were also attributable to the controls program, as shorter contracts were negotiated in order to allow for readjustment once controls were removed).

The most interesting inferences can be drawn from the changing length of contracts containing COLA clauses. While the share of contracts with COLA provisions rose between 1970 and 1972, so did the average length of these agreements. This suggests that in this period, COLA clauses were perceived as providing protection against expected future



price increases. However, the very large increase between 1972 and 1974 in the share of new settlements containing COLA clauses was accompanied by an even more dramatic drop in the average duration of such contracts, from nearly 44 months to less than 21 months. This suggests a growing view that the COLA clauses of the period would not provide sufficient longer-term protection against inflation, and that such protection depended upon the relatively rapid re-opening of contracts. These data thus provide important, albeit indirect and inferential, support for the argument that the major changes in price expectations in Canada in the early 1970s followed the initial relative price shocks.

Table 7 provides annual percentage changes in the CPI and in total wages, salaries and supplementary labour income per paid worker, from 1966 to 1975. The sharp increase in the CPI in 1972 (which, as was shown above, was attributable primarily to price increases in food, energy and other non-wage-related items) was not accompanied by an acceleration of the increase in labour income per paid employee. The rate of average labour income growth rose in 1973 by slightly less than two percentage points. This reflected the beginnings of a response to tighter labour markets and the accelerating price increases which were well underway by 1973, as the CPI increase jumped to 7.5 per cent. However, the 1973 increase in labour income growth was less than that which had occurred in 1969. The major response of wages and salaries to price increases appeared in 1974, as average labour income rose by nearly 15 per cent.

Table 7

Annual Percentage Changes in the Consumer Price Index,  
and Labour Income Per Paid Worker, Canada, 1966-1975

	CPI	Labour Income Per Paid Worker
1966	3.7	6.8
1967	3.6	7.1
1968	4.0	5.8
1969	4.6	8.2
1970	3.3	6.6
1971	2.9	7.3
1972	4.8	7.4
1973	7.5	9.3
1974	10.9	14.8
1975	10.8	14.5

Source: Statistics Canada, The Consumer Price Index, Cat. 62-001, The Labour Force, Cat. 71-001, and National Income and Expenditure Accounts, Cat. 13-201.

In summary, then, the evidence examined in this section supports the view that as Canada entered the 1970s with rising rates of inflation and increasing inflationary expectations, large relative price shocks directly caused the rate of inflation to rise to double-digit levels. This led to expectations of future price increases being revised upwards, with these expectations being manifest in sharply higher wage and salary demands and in larger negotiated settlements. A wage-price spiral resulted, which in turn reinforced expectations of future price increases.

## 6. LABOUR MARKET DEVELOPMENTS AND STRUCTURAL CHANGES: IN THE INFLATION-UNEMPLOYMENT TRADE-OFF

The previous section described the series of events whose combined effect was to shift the short-run inflation-unemployment curve upwards in the 1970s. In other words, as a result of these events, each level of the unemployment rate became associated with a sharply higher rate of inflation. This section reviews a series of changes in the Canadian labour market which also had the effect, in the late 1960s and early 1970s, of causing the short-term inflation-unemployment trade-off to deteriorate. These changes included the rapid growth in the youth and adult female labour forces, the 1971 changes in the unemployment insurance system, and the increasing importance of multi-earner families.

### 6.1 Rapid Growth of the Youth and Adult Female Labour Forces

Through the middle and late 1960s the youth and adult female labour forces increased at very rapid rates. In the case of adult women, this represented the continuation of a trend of rising labour force participation which had emerged in the late 1950s. Up until the early 1960s, the economy had been able to absorb the rapidly growing adult female labour force, and the ratio of adult female to adult male unemployment rates did not increase. It is significant that during the period in which the rapidly increasing adult female labour force was being absorbed, the youth labour force was not growing rapidly. This situation changed in 1963-1964. The youth labour force began to grow rapidly, expanding by 4.0, 4.9, 6.1 and 7.3 per cent annually in the years 1963 through 1966, respectively. As this expansion of the youth labour force proceeded, the ratio of the youth to adult male unemployment rate rose sharply; the ratio of the adult female to the adult male rate also began to increase. This process continued through the early 1970s, as both youth and adult female labour forces continued to grow rapidly.

The rapid increase in the number of women and youths in the labour force probably worsened the inflation-unemployment trade-off. This occurred because of the nature of the demand and supply for different types of labour in the economy, and because of the limited flexibility of relative wages.

Many young people, as well as some adult women (particularly those who have been out of the labour force for some time), are not eligible for jobs requiring particular previous experience or training; they must find "entry-level" jobs, generally low-paying jobs which require little experience or training. For a given wage structure, there is a given rate at which such entry-level jobs are created by a growing economy. It is likely that, in the years after 1963, the growth in the demand for such jobs periodically outstripped the rate at which they were being created.

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<sup>1</sup> For a detailed account of labour force developments see People and Jobs: A Study of the Canadian Labour Market, Economic Council of Canada, Ottawa, 1976.



In a labour market in which wages adjusted smoothly in response to market forces, such a situation would lead to a decline in the relative wages associated with entry-level jobs. The limited evidence available for Canada suggests that such wage adjustment did not take place. One of several factors preventing such adjustment was the attempt to protect or augment the incomes of low-paid employees through minimum wage standards, which received a new impetus with the introduction of a federal minimum wage in 1965. The absence of relative-wage adjustment appears to have resulted in increasing unemployment among groups dependent upon entry-level jobs. In turn, this was reflected in increasing ratios of youth and adult female unemployment rates to the adult male unemployment rate, and consequently, an increase in the aggregate unemployment rate associated with any rate of inflation.

Over the longer run, demographic forces may operate to reverse the deterioration in the short-term inflation-unemployment trade-off which resulted from the increasing importance of youths and adult women in the labour force. This will occur if the share of youths in the labour force declines as a result of the fall in the birth rate in the late 1950s and early 1960s. The effect of this, however, is not likely to be felt until the 1980s.

## 6.2 The 1971 Revisions to the Unemployment Insurance Act

The changes made to Canada's unemployment insurance system in 1971 also stand out as an important factor contributing to the upward drift of the measured unemployment rate and a worsening of the inflation-unemployment trade-off. The 1971 revisions increased the generosity of the UI benefit structure while at the same time significantly reducing the qualifications of prior employment necessary to draw benefits. Other things being equal, such changes would be expected to increase the attractiveness of labour force participation, increase the rate at which people tend to quit existing jobs, and lengthen the duration of time unemployed people tend to spend unemployed. Each of these effects would tend to increase the measured unemployment rate associated with each rate of inflation. The available evidence suggests that in varying degrees all three effects could very well have been operating after 1971.

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Studies on the impact of the Unemployment Insurance Act revisions include: Herbert Grubel, Dennis Maki and Shelly Sax, "Real and Insurance-Induced Unemployment in Canada", Can. J. Econ., May 1975, 174-191; S.F. Kaliski, "Real and Insurance-Induced Unemployment in Canada: a Comment", Can. J. Econ., Nov. 1975, 600-603; Herbert Grubel, Dennis Maki and Shelly Sax, "Real and Insurance-Induced Unemployment in Canada: a Reply", Can. J. Econ., Nov. 1975, 603-605; S.F. Kaliski, "Unemployment and Unemployment Insurance: Testing Some Corollaries", Can. J. Econ., Nov. 1976, 705-712; C. Green and J.-M. Cousineau, Unemployment in Canada, The Impact of Unemployment Insurance, Economic Council of Canada, Ottawa, 1976; Samuel Rea Jr., "Unemployment Insurance and Labour Supply: A Simulation of the 1971 Unemployment Act", Can. J. Econ., May, 1977, 263-278, and Neil McIlveen and Harvey Sims, The Flow Components of Unemployment in Canada, Statistics Canada Special Labour Force Study, Cat. 71-511, July 1978; N. Swan, P. MacRae and C. Steinburg, Income Maintenance Programs: Their Effect on Labour Supply and Aggregate Demand in the Maritimes, Economic Council of Canada, Ottawa, 1976; and Fred Lazar, "The Impact of the 1971 Unemployment Insurance Revisions on Unemployment Rates: Another Look", Can. J. Econ., August 1978, 559-570.

The possibility that the unemployment insurance revisions may have led to higher unemployment rates by increasing labour force participation, job quitting and duration of unemployment is predicated on the assumption that a significant number of persons are able to exercise some choice over whether or not to work, how long to work, and how long to remain unemployed. Most heads of families, for example, probably have relatively little choice in these matters; as the prime support of their families, they must work if work is available. For second and third income earners in the family, and single unattached individuals, the choices are often, although not always, broader. As was noted above, labour force participation of adult women has been rising steadily since the 1950s. The relative importance of multi-earner families has also been increasing since the early 1960s (see below). Finally, the participation rate for youth also began to rise in the late 1960s. These trends suggest that before 1971 the proportion of the labour force accounted for by persons able to exercise significant choices with respect to their labour force activities had been rising.

The participation-inducement effect of the UI changes would show up as an increase in participation rates over and above the secular changes which had been occurring. The examination of participation rates of broad age/sex groups at the national level does not reveal any post-1970 participation rate changes which can be linked to the UI changes. Changes in the participation rates of adult men and adult women in the post-1970 period were well in line with historical experience. The rapid rise of the participation rate of young people in the years 1971-1974 did represent a sharp break with the experience of the 1960s. However, it is important to note that the participation rate of young people in the United States grew, between the late 1960s and mid 1970s, by almost exactly as much as it did in Canada. The behaviour of the participation rate of young persons in Canada may thus have been more the reflection of a general North American phenomenon rather than a response to UI changes.

When provincial and regional data are examined, however, some possibly UI-induced changes in participation rates are more evident. Between 1970 and 1975, aggregate participation rates in Newfoundland, New Brunswick and Prince Edward Island increased very sharply, relative to past increases in those provinces, and relative to the 1970-1975 participation rate changes in other provinces. These three provinces may have had significant amounts of disguised unemployment in 1970 (as reflected in the low levels of their participation rates). The UI changes should have been expected to stimulate labour force participation most in areas in which disguised unemployment was high, since discouraged workers could draw generous benefits if they could find work for eight weeks in a 52-week period. The very high post-1970 participation rate increases in three of the four Atlantic region provinces suggests, therefore, the operation of a UI-inducement effect.

The second type of possible UI effect described above is the "quitting" effect; an increased proportion of persons would be expected to quit their jobs, hoping that the impact of that decision would be cushioned by the enriched UI benefit structure. This is probably the most difficult of the effects to measure, because of the paucity of labour turnover data in Canada. Evidence presented in a number of studies suggests quite clearly, however, that the quitting effect did exist and was quite pronounced.



First, Table 8 presents data referring to claims for UI benefits which were subsequently disqualified by the Unemployment Insurance Commission, because the claimants were judged to have voluntarily quit their jobs, been unavailable for work, been incapable of work, or as having refused to work. As a proportion of the insured population and of initial claims filed, this group of disqualifications declined slowly over the period 1960-1970, increased sharply beginning in 1971 and continued to rise in subsequent years. Although part of the increase in disqualifications may have been the result of tighter administrative controls, it is unlikely that this would account fully for the large increase that did occur. It appears as though the tendency to quit jobs did rise after 1971.

Table 8

Disqualifications for Voluntary Quit,<sup>(1)</sup> Nonavailability, Noncapability and Refusal to Accept Suitable Work, as a Percentage of the UI Insured Population, and of Initial UI Claims Filed, Canada, 1965-1974

	Disqualifications as a Percentage of:	
	UI Insured Population	Initial Claims Filed
1965	4.7	17.9
1966	4.5	17.3
1967	4.0	14.3
1968	3.7	12.6
1969	3.2	12.6
1970	3.3	11.1
1971	4.7	14.5
1972	6.1	23.1
1973	7.5	31.3
1974	8.4	34.3

(1) Disqualifications arising from UIC judgement that the claimant (i) voluntarily quit work without "just cause"; (ii) was not available for work; (iii) was not capable of work; (iv) refused to accept suitable work.

Source: C. Green and J.-M. Cousineau, Unemployment in Canada: The Impact of Unemployment Insurance, Economic Council of Canada, Ottawa, 1976.

The data presented in Table 8 are not available on a disaggregated basis. Two recent studies, however, present evidence on patterns of labour turnover for different age/sex groups.<sup>1</sup> Despite their widely different methodologies, both studies suggest that the 1971 UI revisions induced higher flows of young persons and adult women from existing jobs or non-labour-force activity into unemployment. The effect was particularly pronounced in the case of adult women. For adult men, on the other hand, the tendency to move from jobs or non-labour-force activity into unemployment decreased. The evidence presented in these studies thus supports the arguments that higher rates of job quitting

<sup>1</sup> McIlveen and Sims, op. cit., and Lazar, op. cit.



were induced by the UI revisions, and that this effect was concentrated among those groups which would be expected to most easily adjust labour force activity patterns in response to the revisions.

The third type of potential UI effect described above is the effect on the average duration of a period of unemployment. The measurement of this effect is relatively straightforward, and the evidence seems clear that unemployment duration rose significantly following the UI revisions. One study, for example, provides measures of the percentage increase in the length of an average spell of unemployment completed in 1973 relative to the average length in 1964. The year 1973 was a peak year of economic activity, while 1964 was the middle year in the expansion of the early and mid 1960s. These cyclical differences should have operated to reduce the duration of unemployment in 1973 relative to 1964. The study found, however, that the average duration of unemployment increased for each age/sex group, except in the case of men 14 to 19 years of age.

In conclusion much of the evidence now available suggests that the UI revisions of 1971 may have had the effect of increasing the unemployment rate by inducing higher participation rates, at least in certain provinces, and, more importantly, higher rates of job quitting and longer average durations of unemployment for some groups in the labour force. To the extent that this occurred, the unemployment rate associated with a given rate of inflation rose.

Two additional points should be noted. First, this analysis is not intended to suggest that the 1971 UI changes had only detrimental effects. To the contrary, the changes have had a number of positive effects. For example, with the increased income cushion allowing more time to search for jobs, some unemployed persons have probably been able to secure more personally suitable jobs; the likelihood of subsequent job turnover would be reduced for such persons. The increased generosity of the UI system also made the system a more important element of the Canadian social welfare structure. In this role, the UI system has played an important role in transferring income among individuals and among regions. In addition, the UI system has become a more important part of the Canadian system of macro-economic "automatic stabilizers", and has operated to cushion some of the effects of the economic slowdown which began in the mid 1970s.

Second, the government has recently announced major changes in the UI system. These changes, should tend to diminish the unemployment-augmenting feature of the 1971 changes. In other words, they should operate in the direction of improving the short-term inflation-unemployment trade-off, thus improving the possibility of obtaining a simultaneous reduction in inflation and unemployment rates.

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<sup>1</sup> McIlveen and Sims, op. cit.

### 6.3 Growth of Multi-Earner Families

The rise in the female participation rate has naturally been accompanied by an increase in the proportion of families having more than one income earner. Multi-earner families as a proportion of all families rose from 54 per cent in 1967 to 70 per cent in 1975. As a result, it is more likely now than in earlier years that an unemployed person is a member of a family in which at least one person continues to hold a job. Table 9 shows that between the recession years of 1961 and 1975, the proportion of families containing at least one unemployed person which also contained at least one employed family member rose from 55 per cent to 66 per cent of all families experiencing unemployment.

Table 9

Percentage of Family Units with Some Unemployment  
Having at Least One Person Employed, Canada, Selected Years, 1961-1977

	Percentage
1961	55.1
1963	56.8
1965	60.8
1967	67.7
1969	64.7
1971	64.0
1973	68.9
1975	66.2
1975 <sup>(1)</sup>	72.0
1977 <sup>(1)</sup>	73.8

<sup>(1)</sup> Based on the revised Labour Force Survey.

Source: Statistics Canada, The Labour Force, Cat. 71-001.

This indicates that a growing proportion of Canadian families have at least a temporary income cushion against unemployment, in the form of employment earnings of other family members. It is possible that this cushion may have allowed unemployed persons to search for new jobs for longer periods of time than would have been the case had they been the only income earners in their families. It may also have enabled individuals to search for new jobs more frequently. Thus, this cushion could have augmented some of the effects described above of the 1971 UI changes.

It should be stressed that this argument is not intended to suggest that the growth of multi-earner families has represented a negative development in the Canadian economy. Obviously, many benefits for individuals and for the economy as a whole have been associated with this phenomenon. The argument simply points out that one effect of the rapid increase in the number of multi-earner families has probably been to shift Canada's short-term inflation-unemployment trade-off outwards.

In summary, there were a number of labour market developments in the 1960s and early 1970s which increased the unemployment rate associated with a given rate of inflation.<sup>1</sup> It is highly unlikely, however, that these factors, which affected the structure of the Canadian labour market, were as important as the price shocks of the 1970s in contributing to the overall shift of the short-term trade-off curve which occurred during this period.

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<sup>1</sup> It is also possible that some of these developments could have made the short-term inflation-unemployment trade-off "flatter". For example, it can be argued that the increasing importance of multi-earner families is likely to affect the wage expectations and wage demands of unemployed persons. Because of the income cushion provided by the employed members of their families, unemployed persons might lower their wage expectations and demands more slowly than otherwise as they search for new employment. Such behaviour would increase the degree of wage inflexibility in the economy, and be reflected in a flatter short-term trade-off relationship. Increases in the generosity of the UI system could be expected to have similar effects.





## 7. EMPIRICAL ESTIMATES OF THE CANADIAN SHORT-TERM INFLATION-UNEMPLOYMENT TRADE-OFF

An important empirical question for policy purposes concerns the slope of the short-term trade-off curve. If the curve is relatively flat then increases in unemployment will in the short run yield only small reductions in wage increases and in the rate of price inflation. In the medium term, however, it is this short-term relationship between inflation and unemployment together with the behaviour of inflationary expectations which will determine the inflation-unemployment trade-off. Even with a relatively flat short-term trade-off curve it may be possible to achieve reductions in inflation provided inflationary expectations adjust quickly to declines in the rate of inflation brought about by increases in unemployment. If expectations are reduced only gradually, however, then the process of reducing inflation by means of increased unemployment will be slow and costly.

With a relatively flat short-term trade-off curve a greater burden is placed on the expectations mechanism to bring about reductions in inflation. This results in a greater degree of instability because of the sensitivity of inflationary expectations to price shocks and changes in non-wage-determined prices.

Section 7.1 below surveys seven empirical studies of the Canadian short-term trade-off curve with the objective of determining the approximate slope of the curve.<sup>1</sup> The conclusions from this review are combined in section 7.2 with assumptions about the process of adjustment of inflationary expectations to derive hypothetical medium-term inflation-unemployment scenarios for Canada.

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<sup>1</sup> The studies considered were: Charles Freedman, "The Phillips Curve in Canada", unpublished study, Bank of Canada, November 15, 1976; John F. Helliwell et al., The Structure of RDX2, Bank of Canada Research Study No. 7, 1971; L.N. Christofides, R. Swidinsky, & D.A. Wilton, "A Micro Econometric Analysis of the Canadian Wage Determination Process (1966-75)," April 1978, Paper presented at the 1978 annual meeting of the Canadian Economics Association; Wm. Craig Riddell, "The Empirical Foundations of the Phillips Curve: Evidence from Canadian Wage Contract Data", Paper presented at the 1978 annual meeting of the Canadian Economic Association; Jean-Michel Cousineau and Robert Lacroix, "L'impact de la politique canadienne de contrôle des prix et des revenus sur les entrentes salariales," Economic Council of Canada, Document No. 95, Sept. 1977; Thomas A. Wilson and Gregory V. Jump, "The influence of the anti-inflation program on aggregate wages and prices: a simulation analysis," Institute for Policy Analysis, February 28, 1978; and Frank Reid, "The Effect of Controls on the Rate of Change of Real and Money Wages in Canada, Paper presented at the 1978 annual meeting of the Canadian Economics Association.

## 7.1 The Short-Term Trade-Off: Empirical Evidence

The principal characteristics of seven studies of the short-term trade-off are set out in Table 10. All studies have an equation determining the percentage change in wages, and in all cases the explanatory variables include an inflation-expectations mechanism and a measure of labour market tightness. As is indicated in the table, the studies vary considerably in terms of estimation period, measures of wage changes and labour market tightness, and the inclusion of other variables in the wage equation.

Table 11 presents the effects of specified changes in the unemployment rate on the annual percentage change in wage rates. These results are based on the assumption that all variables in the wage equations other than the labour-market-tightness variable remain unchanged. The table indicates the consequences of a rise or a fall in the unemployment rate of one, two, or three percentage points beginning at the current unemployment rate of about 8.5 per cent.

The general conclusion is that the short-term curve is very flat at current rates of unemployment. If the unemployment rate increases from 8.5 per cent to 11.5 per cent, the estimated reduction in wage inflation is in the range of .22 to .89 percentage points, or an average of .47 points. In other words, 3 extra points on the unemployment rate (or a reduction in real GNE of 7 to 8 per cent) buy a reduction in wage inflation in the order of one half of one percentage point. (These predicted declines in wage increases for unemployment rates in the 8.5 to 11.5 per cent range should be regarded as hypothetical since unemployment rates in this range have not been experienced in Canada in the postwar period.) On the other hand, a one, two, or three-percentage-point reduction in the unemployment rate leads to average estimated increases in wages of .29, .70, and 1.33 percentage points, respectively. It is clear, then, that the short-term curve is very flat at unemployment rates exceeding 7.5 per cent and still quite flat at unemployment rates in the 6.5 to 7.5 per cent range.

In comparing the estimates in Table 11 a number of factors should be kept in mind. First, it is difficult to compare the "accuracy" of the wage equations because of important differences in methodology. For example, equations using wage settlement data tend to explain statistically less of the variance in wage change than equations using aggregate earnings data. In all cases, however, the equations are satisfactory in terms of statistical significance and signs of the explanatory variables. Second, wage settlement data provide a measure of wage

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<sup>1</sup> A number of adjustments had to be made to the individual equations in order to derive the estimated relationship between wage changes and the unemployment rate. In the case of the Christofides-Swidinsky-Wilton and Cousineaux-Lacroix studies, changes in the unemployment rate were translated into changes in the help-wanted index using an equation relating these two variables and estimated over the period 1974I to 1977IV. For the Reid study, an equation relating vacancies to the unemployment rate was used. Other adjustments were also made. A more detailed description of these adjustments can be obtained from the Long Range and Structural Analysis Division, Department of Finance.



Table 10

## Alternative Inflation-Unemployment Relationships, Canada

		Freedman	Helliwell et. al.	Christofides- Swidinsky- Wilton	Riddell	Reid	Cousineau- Lacroix	Wilson- Jump
Estimation period		61 II - 75 IV	55 I - 68 IV	66-75	53-73	67 I - 75 III	67 I - 75 III	55 II - 75 III
Wage measure		E	E	CM	CM	CA	CA	E
Labour market tightness measure		U*	U	HW	U	V	HW	U
Expectations mechanism		Yes	Yes	Yes	Yes	Yes	Yes	Yes
<u>Other Variables</u>								
Catch-up term		No	Yes	Yes	Yes	No	No	No
Change in unemployment		No	No	No	Yes	No	No	No
Inflation uncertainty		No	No	No	Yes	No	No	No
U.S. wages		No	No	No	No	No	No	Yes
Social insurance taxes		No	No	No	No	No	No	Yes

Symbols

E Earnings  
 CM Contracts (micro)  
 CA Contracts (aggregate)  
 U\* Unemployment rate adjusted for effects of the 1971 UI revisions  
 U Unemployment rate  
 HW Help-wanted  
 V Vacancies divided by labour force

Source: See footnote 1, page 43.

Table 11

Estimated Impact of Changes in the Unemployment Rate on the Annual Percentage Change in Wages, Canada

Change in Unemployment rate (per cent)	Change in Percentage Change in Wages						
	Freedman	Helliwell et. al.	Christofides- Swidinsky- Wilton	Riddell	Reid	Cousineau- Lacroix	Wilson- Jump Average
<u>Increase</u>							
8.5 to 9.5	-.38	-.10	-.21	-.10	-.13	-.34	-.22
8.5 to 10.5	-.67	-.17	-.35	-.18	-.24	-.60	-.39
8.5 to 11.5	-.89	-.22	-.49	-.25	-.33	-.80	-.53
<u>Reduction</u>							
8.5 to 7.5	+.53	+.16	+.28	+.13	+.17	+.47	+.27
8.5 to 6.5	+1.33	+.42	+.68	+.29	+.39	+1.14	+.62
8.5 to 5.5	+2.66	+.91	+1.30	+.52	+.69	+2.15	+1.10
							+1.33

Source: Long Range and Structural Analysis Division, Department of Finance.

change which is superior to that of aggregate earnings data. Earnings data capture the wage changes occurring at the time, but are also affected by past wage settlements, because of the existence of multi-year contracts, and are also affected by a variety of other cyclical and secular factors.<sup>1</sup> Third, an unemployment rate which has not been adjusted to capture the effects of structural changes in the labour market is unlikely to provide a satisfactory measure of labour market tightness.

The Christofides-Swidinsky-Wilton, Reid, and Cousineau-Lacroix estimates should be given most weight on the basis of the above considerations. The Christofides-Swidinsky-Wilton estimates suggest that the slope of the short-term curve is close to the average of all seven studies, while the Reid study yields below-average estimates of the slope. The Cousineau-Lacroix study predicts a steeper short-term curve, but this study has the theoretically undesirable property that only a small portion of the value of expected inflation is reflected in wage increases. These considerations suggest that a slope approximated by the average for the seven studies would represent the most acceptable estimate.

## 7.2 The Medium-Term Trade-Off

When these estimates of the slope of the short-term curve are combined with assumptions concerning the behaviour of price expectations, it is possible to determine the medium-term inflation consequences of alternative hypothetical unemployment rate paths. Table 12 sets out three hypothetical unemployment rate scenarios over the period 1978-1981. In the first two cases, the economy achieves close to a 6 per cent unemployment rate by 1981. The most optimistic path is case A, in which the unemployment rate falls steadily from 8.5 per cent in 1978 to close to 6 per cent in 1981. An alternative path would be a rise in the unemployment rate to 9.0 per cent in 1979, followed by a very rapid recovery in 1980-1981 (case B). Case C represents possible unemployment rates under conditions of below-average growth over the entire period.

The second panel of the table indicates the output losses associated with cases B and C, in comparison with case A. If the economy were to follow the path of case B, rather than that of case A, there would be a cumulative output loss over the period of about 5 per cent of GNE. The below-average growth profile of case C would imply a cumulative output loss of nearly 10 per cent relative to the performance in case B.

The third panel of the table presents estimates of the improvements in inflation, again relative to the situation in case A, that might result by maintaining the higher unemployment rates of cases B and C. Higher unemployment rates lead directly to smaller wage increases and hence to lower rates of inflation, which in turn reduce inflationary expectations and lead to further reductions in wage changes. The most relevant comparison is between case B and case C. These estimates show that a four-year period of consistently below-average growth would lead to a rate of inflation by 1981 about one percentage point below that which would obtain if the economy were to try to attain a 6 per cent unemployment rate, with considerably faster growth.

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<sup>1</sup> Wage settlement data, however, exclude the non-unionized sector. This sector may exhibit a greater degree of wage flexibility than the unionized sector.



Table 12

Alternative Paths for Inflation and Unemployment, Canada, 1978-1981(A) Assumed Unemployment Rates

	<u>Case A</u>	<u>Case B</u>	<u>Case C</u>
1978	8.5	8.5	8.5
1979	7.7	9.0	9.0
1980	6.9	7.5	9.0
1981	6.1	6.1	8.5

(B) Output Shortfall in Relation to Case A<sup>(1)</sup>  
(Cases B, C minus case A, as a percent of GNE)

	<u>Case B</u>	<u>Case C</u>
1978	0.0	0.0
1979	3.3	3.3
1980	1.5	5.3
1981	-	6.0
Cumulative	4.8%	14.5%

(C) Inflation Shortfall in Relation to Case A  
(Cases B, C minus case A; annual percentage change in price level)

	<u>Case B</u>	<u>Case C</u>
1978	0.0	0.0
1979	-0.3	-0.3
1980	-0.5	-0.9
1981	-0.5	-1.6

(1) The estimated output shortfalls were obtained assuming an Okun's Law relationship for Canada. A coefficient of 2.5 was used. This implies that a one-percentage-point reduction in the unemployment rate is associated with a 2.5-percentage-point reduction in the GNE gap. In view of the similarity between the results of the Christofides-Swidinsky-Wilton study and the average for the seven studies, the labour market tightness variable of the Christofides-Swidinsky-Wilton study was used. To account for the effects of expected inflation it was assumed that expected inflation was determined as a weighted average of inflation in the previous two years. Inflation in the year immediately past was given a weight of .75.

Source: Long Range and Structural Analysis Division, Department of Finance.

It is worth emphasizing three points with respect to the above examples. First, in these calculations the rate of inflation is determined solely by the rate of change of wages. As previous sections have shown, price shocks and non-wage-determined prices have been important factors in Canada's inflation experience. For the most part their effect has been

to raise the rate of inflation directly and inflationary expectations indirectly. However with good price performance, for example in the case of food, the opposite effect could occur.

Second, there is no consideration given to the means used to achieve the alternative unemployment rate scenarios. For example, a restrictive monetary policy intended to maintain slower growth in the economy would likely lead to an appreciation of the exchange rate. This would directly reduce prices which in turn would reduce inflationary expectations. The estimates in Table 12 would thus underestimate the inflation gains in this case.

Third, the examples are intended to illustrate the nature of the medium-term trade-off between inflation and unemployment. In choosing between inflation and unemployment one must consider not only the costs of slower growth and higher unemployment but also the potential benefits from sustained lower rates of inflation.





## 8. INCOMES POLICIES AND THE SHORT-TERM TRADE-OFF CURVE

Given the above evidence on the flatness of the short-term inflation-unemployment trade-off curve and the role of expectations and price shocks in the inflation process, it is not surprising that substantial effort has been devoted to finding methods for achieving lower rates of inflation other than by raising unemployment rates. One such method is incomes policies.

The purpose of incomes policies is to reduce inflation by shifting the short-term inflation-unemployment trade-off curve towards the origin, so that at any given unemployment rate the rate of inflation will be reduced. If incomes policies succeed in this aim and if they are in place for a sufficient length of time, then it is likely that expectations of inflation will also be reduced. If this happens, then the short-term trade-off curve will not shift outwards again once the incomes policies are removed. Temporary incomes policies will have succeeded in reducing price expectations and shifting the trade-off curve directly, so that less unemployment is required to achieve a given reduction in inflation.

On October 13, 1975, the Anti-Inflation Program (AIP) was introduced by the federal government. The economic circumstances leading up to the AIP were extremely bleak. Output growth had declined significantly; a deteriorating competitive position vis-à-vis the U.S. was threatening to cause serious balance of payments problems; the unemployment rate had risen above 6 per cent; and the country was experiencing double-digit rates of inflation with rising inflationary expectations. An attempt to obtain public consensus on wage and price restraint had failed.

In these circumstances, sole reliance upon demand management policies in combatting inflation was rejected, because of the extent of the output losses and the higher unemployment rates which would likely have resulted. Instead, the AIP, which was designed to directly reduce the rates of growth of wages and prices, and through this to reduce inflationary expectations, was introduced. Consistent monetary and fiscal policies were regarded, however, as an essential part of the AIP.

Table 13 presents data on increases in base wage rates negotiated in new collective agreements, and increases in wages and salaries per employed person, before and after the imposition of controls. Leading up to the third quarter of 1975 base rates in new settlements were increasing at annual rates exceeding 20 per cent. Average wages and salaries were increasing at annual rates of about 16 per cent.

During the controls period both money supply growth and real growth declined, and the unemployment rate rose. These factors would have exerted some downward pressure on wage and salary increases even in the absence of controls. Inflationary expectations may also have been declining prior to the imposition of controls. However, given the

evidence presented in the previous section, these forces by themselves would not have been adequate to reduce the rate of increase of base wage rates from over 20 per cent in 1975 to a little over 12 per cent in 1976 and to 8 per cent in 1977.

Table 13

Percentage Increases in Negotiated Base Rates,<sup>(1)</sup> and  
Wages and Salaries per Employed Person, Canada, 1970-1978

	First Year Wage Settlements (per cent change from previous year)	Wages and Salaries per Person Employed
1970	10.3	7.1
1971	9.3	7.6
1972	9.6	8.4
1973	11.5	10.3
1974	17.0	15.0
1975	21.1	14.7
1976	12.5	13.2
1977	8.0	8.9
1975: I	21.8	16.0
II	22.4	16.1
III	21.4	14.7
IV	18.8	12.3
1976: I	16.0	12.2
II	12.6	14.7
III	12.5	10.8
IV	9.1	15.1
1977: I	8.6	11.5
II	8.2	8.3
III	7.6	10.2
IV	7.7	5.8
1978: I	7.1	6.1
II	6.6	5.5

(1) Data based on bargaining units of 500 or more employees, excluding construction.

Source: Collective Bargaining Division, Labour Canada, and Statistics Canada, National Income and Expenditures Accounts, Cat. 13-201, and The Labour Force, Cat. 71-001.

Table 14 sets out the behaviour of the CPI and its major components, and the AIP targets, over the period of controls. The AIP targets were defined in terms of the all-items CPI and were set at 8, 6 and 4 per cent for the year-on-year increases in October 1976, 1977 and 1978,

respectively. However, food prices at the farm gate were specifically excluded from direct mandatory controls. In addition, energy prices were allowed to continue to rise towards world levels, as a matter of policy.

Table 14

Percentage Changes in the Consumer Price Index and the AIP Targets, Canada

	Oct. 75	Oct. 76	Oct. 77	June 78	Oct. 78
(percentage changes from same month in previous year)					
All-items CPI	10.6	6.2	8.8	9.2	-
Food	12.0	-0.9	12.7	17.9	-
All-items ex. food	10.2	9.1	7.3	5.9	-
Energy	16.3	14.1	11.2	8.5	-
All-items excluding food and energy	9.5	8.5	6.8	5.7	-
AIP target	-	8.0	6.0	-	4.0

Source: Statistics Canada, The Consumer Price Index, Cat. 62-001.

The table shows clearly the role which food and energy prices played while the program was in operation. In the first program year, the 8-per-cent target was easily achieved because of an unexpected decline in food prices. In 1977 the re-emergence of double-digit increases in food prices was in large part responsible for the CPI growth rate's exceeding the target rate. In both years, the policy of letting energy prices continue to rise towards world levels put further pressure on the all-items CPI.

The behaviour of the exchange rate was also a critical factor in affecting the behaviour of the all-items CPI. The appreciation of the exchange rate in 1976 was a significant factor in the favourable food-price performance in that year. Conversely, the sharp declines in the exchange rate in 1977 and 1978 contributed strongly to both food-price and non-food-price inflation in these years.

While the objective of a system of wage and price controls is to shift the short-term trade-off curve towards the origin, there are risks inherent in such a program. Most importantly, some prices are not directly determined by wages and salaries. Consequently, success in restraining wages and salaries will not lead to equal success in restraining prices if other factors cause prices to continue to rise. Such other factors are likely to be particularly important in the case of basic commodities such as food and energy. If these prices cannot be controlled, there is a danger that price inflation will fall by less than wage and salary inflation, with the result that price expectations fail to drop by as much as planned. In such a case, the termination of controls may be associated with a "bubble" of wage and price increases which could offset the gains made during the controls period.



Canada's recent experience with incomes policies illustrates the importance of these factors. The possibility of Canada's incomes policies' leading to a lasting improvement in the inflation-unemployment trade-off has been seriously weakened by the behaviour of food prices during 1977 and much of 1978, and by the recent exchange rate depreciations. With food prices rising at double-digit rates and with the aggregate rate of inflation rising as a result, inflationary expectations could continue to be high. In the post-controls period these high inflationary expectations could lead to higher wage and salary demands and to a renewed wage-price spiral. This underscores the need for changed price-and-income determining behaviour which does not build the effects of temporary price changes into Canada's cost-price structure.

## 9. THE RELATIONSHIP BETWEEN CANADIAN AND U.S. INFLATION

### 9.1 The Process of Insulation

The third proposition set out in Canada's Economy was that Canada's inflation rate need not be tied to American inflation in the medium term. The second proposition stated that it was possible to reduce inflation and unemployment simultaneously. Clearly the two propositions are related. If U.S. inflation rates were to fall, then it would not be necessary to break the links between Canadian and U.S. inflation in order to achieve decelerating rates of inflation in Canada over the medium term. However, the current likelihood of higher rates of inflation in the U.S. suggests that Canada would have to depart from the U.S. experience to achieve a deceleration in inflation.

How can an economy insulate itself from higher world inflation? Under a fixed exchange rate it is not possible for a country to experience a very different rate of inflation from the rest of the world for a prolonged length of time and maintain the value of its currency. An inflation rate significantly above the world rate will eventually lead to balance of payments deficits which will require either the adoption of measures to reduce inflation or a depreciation of the exchange rate. On the other hand, a very low relative inflation rate will eventually lead to balance of payments surpluses and foreign exchange inflows which will either increase the domestic money supply or force an upward movement of the exchange rate. Over the long run, therefore, the international transmission of inflation is likely to be very effective under a fixed exchange rate.

By contrast, a country can insulate itself from higher world inflation if it adopts a flexible exchange rate in combination with a policy of controlling the rate of growth of the money supply. Even in this case, however, there may be forces which make complete insulation difficult to achieve, and the process may not be costless in terms of output and employment growth.

To illustrate this, consider a situation in which both the world and the domestic rates of inflation are already at high levels, and the authorities wish to reduce domestic inflation below the world level by slowing the rate of growth of the money supply. The reduced monetary expansion will lead fairly quickly to higher interest rates, an appreciation of the exchange rate, and a reduction in domestic demand. The higher exchange rate will directly lower the prices of most imports and some exports. In the absence of changes in money wages, domestic firms will either lose competitive position (if they maintain profit margins) or earn lower profits (if they reduce prices to bring them into line with foreign prices). Employment and output will fall because of both the domestic effects of tighter money and the loss of competitive position and resulting trade deficit. This unfavourable situation will persist until wage and price increases and inflationary expectations decline.

Thus, the degree of flexibility in wages, prices, and inflationary expectations together with the precise pattern of exchange rate adjustment is critical to the insulation process. If there is a high degree of wage flexibility (i.e., a steep short-term trade-off curve) and if inflationary expectations adjust quickly in response to declining rates of inflation, then it will be possible to achieve lower rates of inflation with minimal output losses.

With a high degree of wage inflexibility in response to changes in the unemployment rate the adjustment of inflationary expectations becomes more critical to the insulation process. The exchange rate appreciation will directly lower prices and through this lower inflationary expectations. A significant and quick response in inflationary expectations may provide the means of achieving lower rates of inflation without substantial increases in unemployment. On the other hand, if inflationary expectations are firmly entrenched and adjust only slowly, and wage flexibility is limited, the efficacy of aggregate demand policies combined with a strengthening exchange rate in reducing domestic inflation below world inflation without substantial output losses will be reduced.

To the extent that the direct price effect of the appreciation speeds up the adjustment process, it may do so at the expense of the current account of the balance of payments and the profitability of exporting and import-competing firms. If wages react slowly, a continuously appreciating exchange rate implies a continuing loss in competitiveness and profitability. Under such conditions it is possible that the exchange rate will not continue to appreciate, despite the maintenance of a restrictive monetary policy. The effects of a negative trade balance may eventually outweigh the effects of high domestic interest rates on capital inflows, and the economy will then lose the favourable direct price effect of exchange rate appreciations. The economy may be left with creating unemployment as the sole means for reducing wage and price inflation.

The above example highlights the importance of the slope of the short-term trade-off curve and the role of inflationary expectations in the achievement of insulation from higher world inflation without substantial costs in the form of higher unemployment. For Canada the empirical evidence suggests that wage and salary increases respond quite slowly to increases in the unemployment rate when the economy is operating at unemployment rates above 6.5 per cent. As a result the burden of the adjustment rests primarily on the direct price effects of the exchange rate appreciation and the response of inflationary expectations.

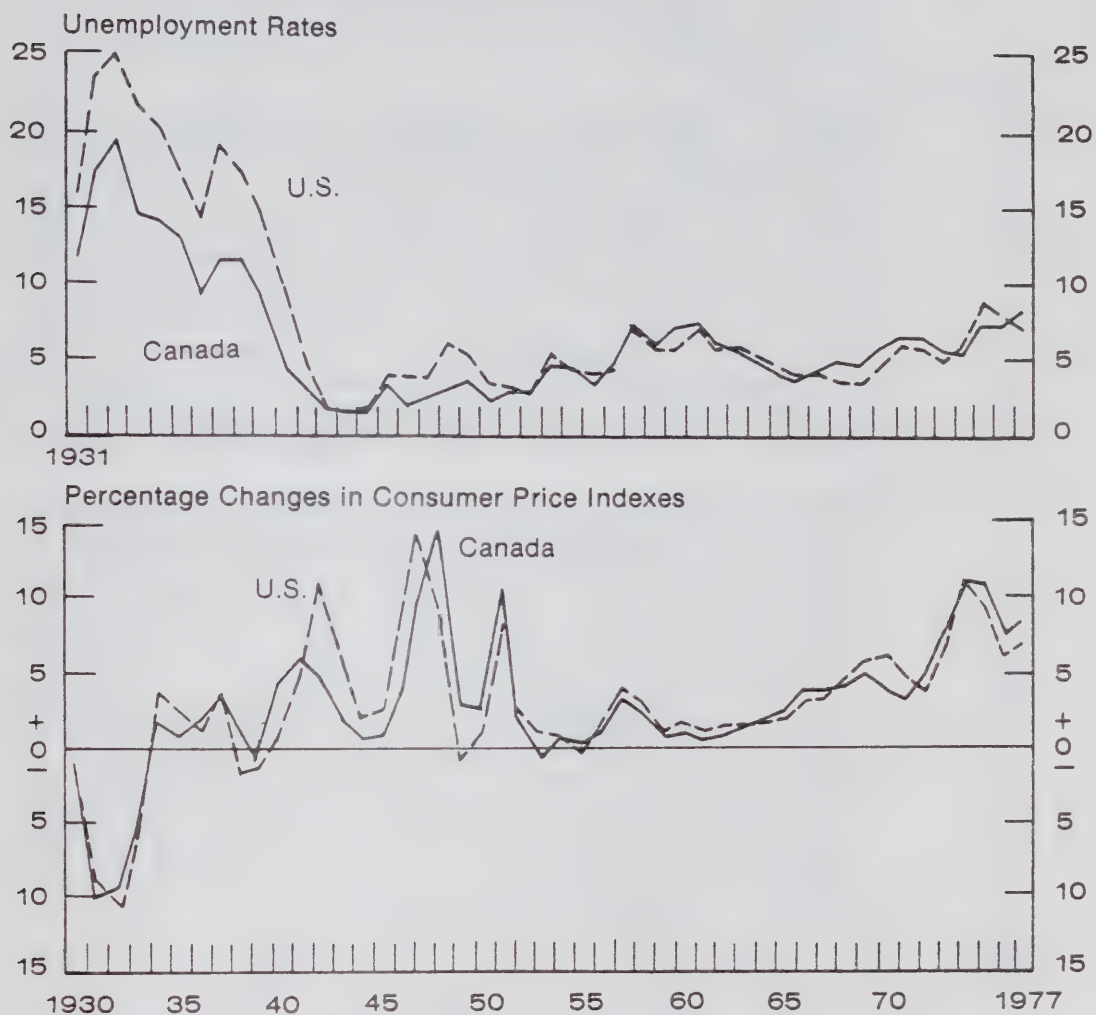
## 9.2 Ties with the United States

Canada's close ties with the U.S. increase the difficulty of achieving insulation. Chart 6 sets out the historical record. Since 1930, Canada's inflation and unemployment rates have followed the corresponding American rates very closely. It can be seen from the chart that Canada's inflation rate has diverged markedly from that of the U.S. only under the special circumstances of the Second World War and immediate postwar period. This broad similarity of inflation rates has persisted under both fixed and flexible Canadian exchange rates.



Chart 6

Aggregate Unemployment Rates, and Percentage Changes in Consumer Price Indexes, Canada and the United States, 1930-1977



Source: For Canada, Statistics Canada, The Consumer Price Index, cat. 62-001, The Labour Force, cat. 71-001, and Canadian Statistical Review Historical Summary, cat. 11-505; for the United States, United States Government, Economic Report of the President, January 1978, and Bureau of the Census, Historical Statistics of the United States, 1789-1945.

In part, these similarities may have arisen because Canada has often followed aggregate demand policies similar to those of the U.S. There are as well many links between the Canadian and American economies which, in the absence of significantly different policies, may have tended to produce very similar inflation and unemployment rate trends. Such linkages will have to be weakened, if not broken, if Canada is to obtain an inflation rate significantly below that of the U.S. for any prolonged period.

These linkages are likely to affect the behaviour of both firms and workers. Firms may expect domestic inflation to follow American inflation, such expectations being strengthened by institutional links through parent-subsidiary relations and manufacturers' and trade associations at the continental level. Individual domestic firms may be more aware of American price trends and outlooks in their own industries than they are of exchange rate changes. Workers too may expect Canadian inflation to follow the U.S. trends, and linkages operating through international unions may promote similar nominal wage increases in Canada and the U.S. These direct ties will be stronger, the closer are the economic and institutional links between the two countries and the more closely domestic inflation has in fact followed American inflation in the past.

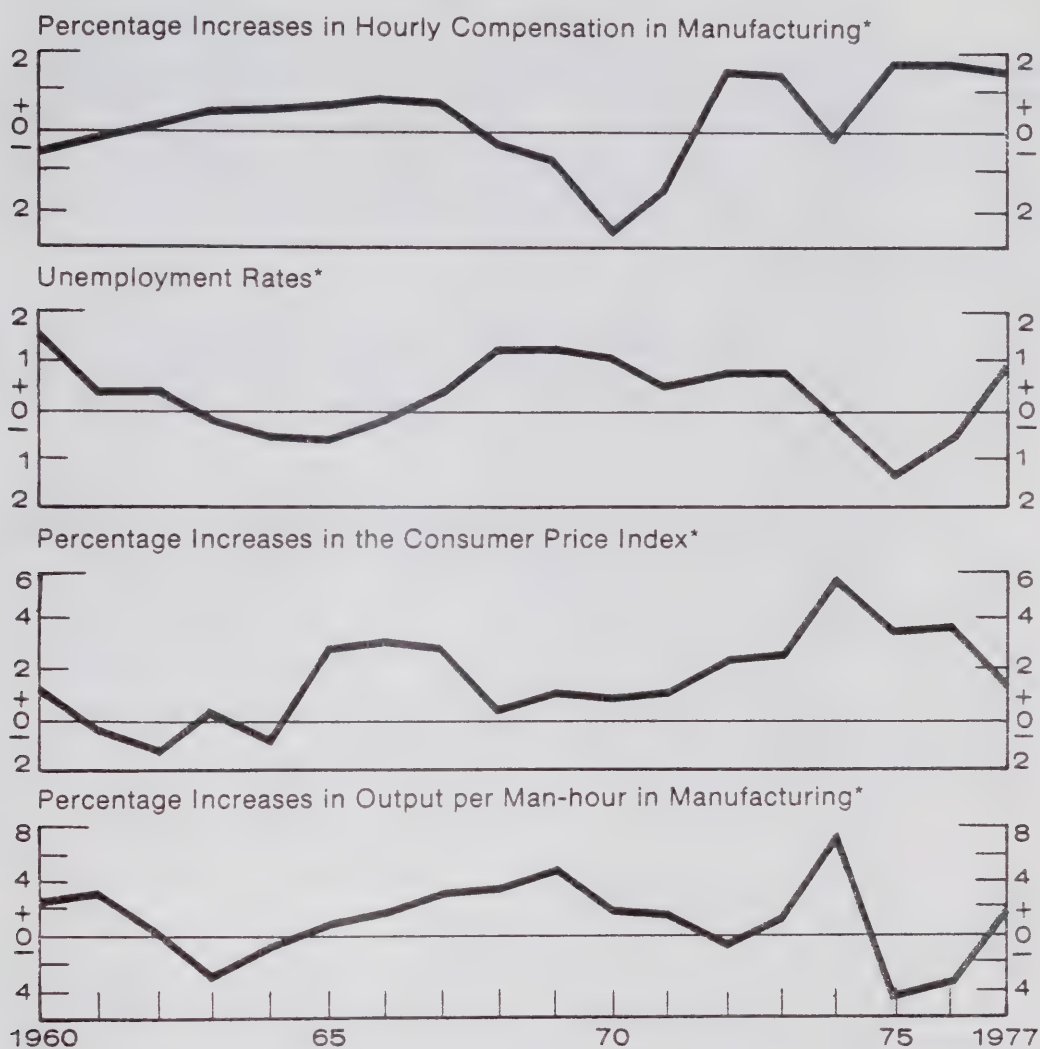
Related to these issues is the question of exchange rate expectations. Small changes in the exchange rate may be regarded as temporary, and thus may not be reflected in price changes. Indeed, this may make economic sense, for price changes are often costly, and it would be inefficient for the firm to adjust prices in line with weekly or monthly variations in the exchange rate. Rather, firms may find it more efficient to absorb short-run gains and losses arising from exchange rate fluctuations. If an exchange rate change is to be fully reflected in price responses, it must be regarded as permanent, and this means that such changes may affect prices only after a considerable period of time. The length of this lag will depend on the time required for an exchange rate change to come to be regarded as permanent rather than temporary. These considerations suggest that there may be strong direct ties between Canadian and American prices, ties which make insulation from U.S. inflation difficult to achieve.

The unemployment rate in the U.S. has been declining since 1975 and has recently fallen to below 6 per cent. There are now signs that the U.S. rate of inflation may begin accelerating. Canada's Economy envisaged a medium-term growth scenario in which the gap between U.S. and Canadian unemployment rates would narrow while at the same time Canada achieved rates of inflation lower than in the U.S. Is such a performance possible?

Chart 7 plots the annual differences between Canada and the U.S. for four variables: the percentage increase in the CPI, the aggregate unemployment rate, the percentage increase in hourly compensation and the percentage increase in output per man-hour in the manufacturing sector. It can be seen from this chart that Canada's inflation rate was always within one percentage point of the U.S. rate throughout the 1960s, but that this differential widened in the 1970s. As well, over the period 1960-1977 Canada's unemployment rate never differed from the U.S. rate by more than one and one-half percentage points. More interesting, however, is the relationship between the Canadian-U.S.

Chart 7

Aggregate Unemployment Rates, and Percentage Increases in Consumer Price Indexes, Hourly Compensation in Manufacturing, and Output per Man-hour in Manufacturing, Canada minus the United States, 1960-1977.



\*Canada minus the United States

Sources: For Canada, Statistics Canada, Canadian Statistical Review, cat. 11—003E, and Aggregate Productivity Measures, cat. 14-201; for the United States, United States Government, Economic Report of the President, January 1978, and Bureau of Labor Statistics, Monthly Labor Review.



differences in price increases and unemployment rates. Over much of the period, there was a clear tendency for Canadian price increases to rise relative to U.S. price increases when the Canadian unemployment rate fell relative to the U.S. unemployment rate.

The middle two panels of Chart 7 show that since 1965 there has been a fairly close relationship between the difference between Canadian and American manufacturing wage increases and the difference between Canadian and American unemployment rates. Canadian wage increases were very high relative to U.S. wage increases in 1965-1967 and in 1974-1976, years in which the Canadian unemployment rate was close to or lower than the U.S. unemployment rate. On the other hand, when the Canadian unemployment rate was significantly above the U.S. rate in 1968-1971 and in 1977, Canadian wage increases were lower relative to U.S. wage increases.

These relationships may seem at first glance to preclude the achievement of declining rates of inflation and unemployment in Canada in the face of rising U.S. inflation. Some divergence from the U.S. inflation rate could be achieved however if there were a substantial improvement in Canada's productivity performance relative to the U.S. Such an improvement did emerge in Canada in the late 1960s (see the last panel of Chart 7), but it was translated into relative increases in wages quite quickly. Over the next two to three years there may be some potential for improved productivity performance in Canada. The U.S. economy is now operating close to full employment. At this stage of the cycle productivity growth typically declines. In the early stages of a recovery, productivity growth normally increases. It is this stage that the Canadian economy is now entering. Nevertheless, even with improvement in productivity performance, there will have to be a change in wage-price behaviour in order to sustain decelerating rates of inflation in Canada. If wage demands respond to external price shocks (e.g., food price increases) or if attempts are made to make up perceived losses over the last few years, then any gains stemming from improved relative productivity performance may be offset, or more than offset, by accelerating wage and price increases.

Can Canada achieve falling rates of inflation and unemployment when confronted with accelerating U.S. inflation? Aggregate demand policies and a strengthening exchange rate could reduce the rate of inflation and unemployment. However, the achievement of significantly lower rates of inflation, and declines in unemployment rates that would bring the economy closer to cyclically-adjusted GNE levels over the next four years, would require that aggregate demand policies be complemented by a willingness by all sectors to exercise restraint on wage and price increases. Only if such behaviour is forthcoming and if such policies can be implemented effectively will there be any chance of reducing Canadian inflation below U.S. inflation without substantial output and employment losses.

## 10. CONCLUSION

In Canada's Economy the argument was made that a reduction in the rate of inflation must be an integral part of a medium-term economic recovery. Because the recovery also envisaged a reduction in the unemployment rate, the medium-term projections implied, therefore, a simultaneous reduction in the unemployment and inflation rates. Historically, these two rates have not moved together over periods as long as that covered by the projected medium-term recovery. Indeed in every postwar recovery a falling unemployment rate has been accompanied by some acceleration in the rate of inflation. This had led some observers to question the possibility of achieving lower inflation and unemployment rates simultaneously. In addition, Canada's Economy argued implicitly that Canada could achieve a lower rate of inflation than that of the U.S. over the medium term. This view was also questioned by a number of observers.

This paper has attempted to throw some light on these two related questions. The central focus of the paper has been the short and medium-term inflation-unemployment trade-off in Canada and its behaviour over the postwar period. Although it is true, theoretically, that in the long run increases in the rate of growth of the money supply will also lead to proportional increases in the rate of inflation, it is also true empirically that in the short and medium term, increases in the money supply do not translate into proportional increases in the rate of inflation, nor do decreases in the money supply necessarily lead to proportional reductions in the rate of inflation. Because of this, trade-offs between inflation and unemployment will exist in the medium term.

The short-term relationship between changes in the unemployment rate and changes in wages and salaries depends fundamentally on the flexibility of money wages. A review of recent empirical work for Canada suggests that an increase in the unemployment rate from 8.5 per cent would have only a small effect on the rate of change of wages in the short run. If the short-term trade-off curve is as flat as the evidence suggests, then a strategy of relying on the creation of excess slack in the economy to reduce inflation will prove to be ineffectual.

In the medium term, inflationary expectations play a key role in determining the rate of change of wages and prices in the economy. While it is not possible to say precisely how expectations are formed, there seems little doubt that they are heavily influenced by past price behaviour and perhaps as well by policy actions. High inflationary expectations continue to be central to the current inflation-unemployment dilemma. Just as Canadians were at one time accustomed to inflation rates as low as 1 to 2 per cent per year, they may now have come to expect inflation rates as high as 7 or 8 per cent. Just as the price shocks of the early 1970s contributed significantly to increased inflationary expectations, the large increases in food prices in 1977 and 1978 may result in rising inflationary expectations, and lead to higher wage demands and higher prices.

Not all prices are determined by wage costs. For many commodities demand factors and supply constraints are more important. Exchange rate changes, government charges and taxes are also critical in determining prices. These factors played an important role in the inflation process in the 1970s.

Decelerating rates of inflation over the medium term continue to be the necessary requirement for the achievement of acceptable rates of real growth. It is clear that the use of aggregate demand policies alone will not be sufficient to achieve major reductions in the rates of inflation and unemployment simultaneously. There will be a continuing need for the development of a broad set of complementary policies by all levels of government and for the evolution of price-and-income-determining behaviour consistent with the achievement of lower rates of inflation over the medium term.



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